

SKYWAYS

MILITARY ★ CIVIL ★ COMMERCIAL AVIATION

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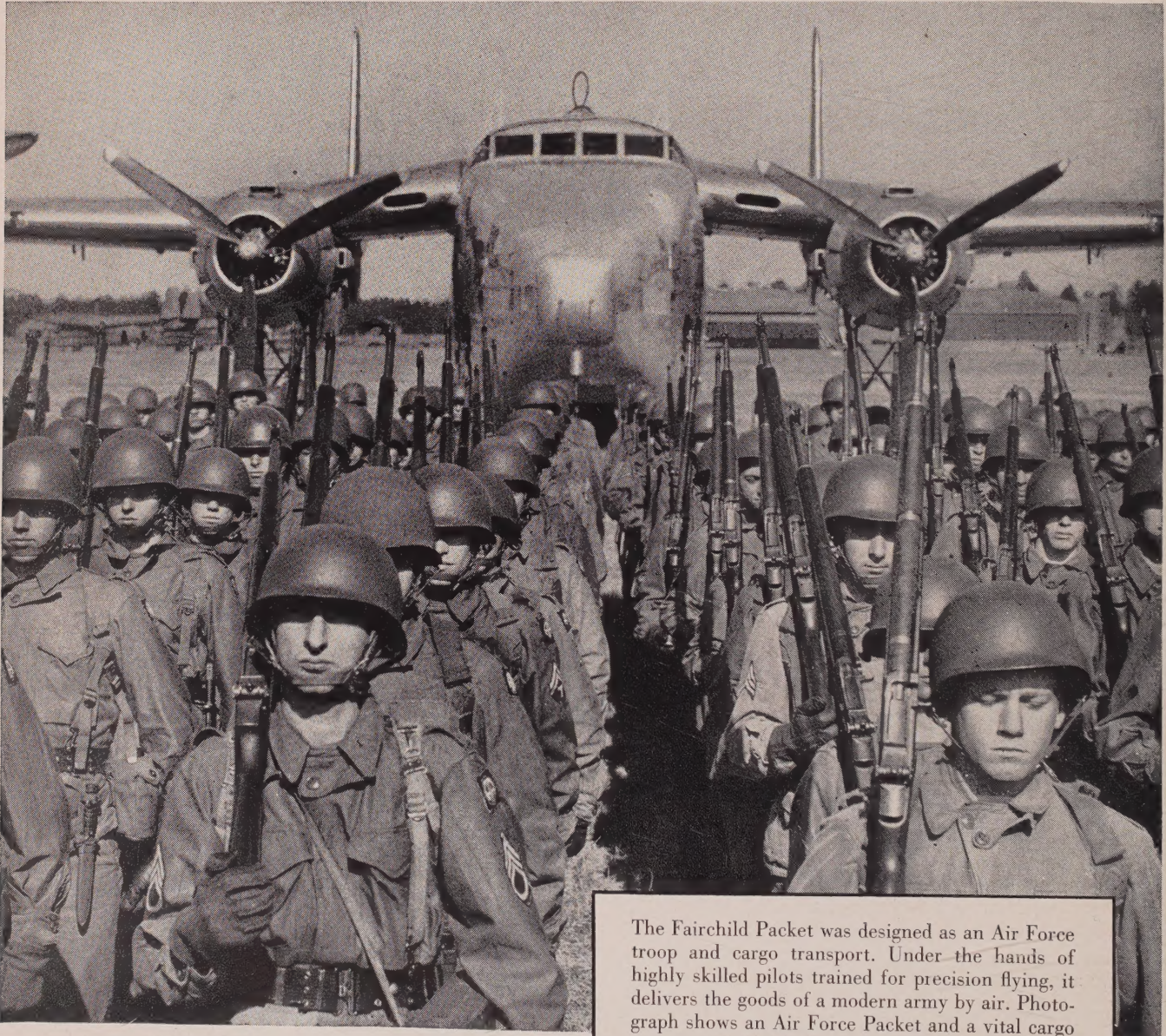
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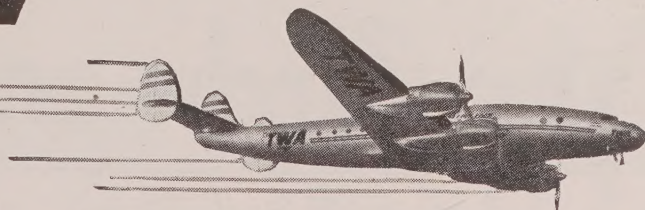
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The Birdmen's Perch

By *Major Al Williams*, ALIAS, "TATTERED WING TIPS,"
Gulf Aviation Products Manager, Gulf Bldg., Pittsburgh 30, Pa.

We can tell you a little more about our new Gulfhawk, now.

We've gotten a little more time in her, and honest—that F8 is an airplane!

Matter of fact, she's so easy to fly and handle that we sometimes feel that if we got out, she'd just go tooting along by herself until she got wherever she was going. At which point, she'd undoubtedly shoot a landing all by herself.



Fast, too. Fastest prop-driven plane in the world.

A while back we gave her a chance to get off in a hurry. We tied two JATO's under her belly and squared off into about a 5- or 6-mile wind.

We whacked the throttle and fired the jet-bottles—and, mister, we got upstairs quick!

Took us 2.4 seconds to get off! (Yep, that decimal belongs there.)

More about the Gulfhawk IV later.

We Told You So!

We're getting more reports from you pilots on Gulfpride—Series D—all the time.

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lubricant for horizontally opposed engines. Apparently, you've found that it frees sticking valves and rings and keeps them free longer.

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After all, we told you all these things way back in July when we announced the oil!

And when we talk about oil in the Perch you can believe everything you read.

Little Known Facts Dept.

Senior Perch Pilot Charles Miller—the world's *first* SPP—is back with us!

Having obtained his Senior Commis-

sion with 5 Little Known Facts, Miller seems to be shooting for the Command rating (20 Facts) . . . a position so exalted that we shudder just thinking about it!

One reason that Miller is our favorite Perch Pilot, in addition to being the high-ranking, is that he always sends in proof (PROOF!) with his Facts.

And that's more than some of you do!

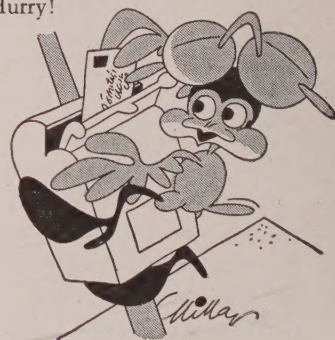
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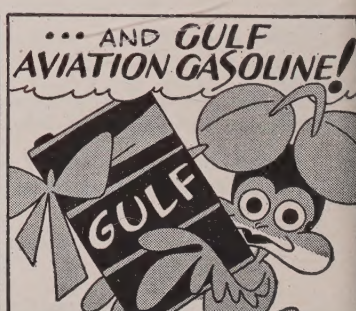
See how easy it is? Just write up a Fact, prove it, and send it to the address at the top of the page.

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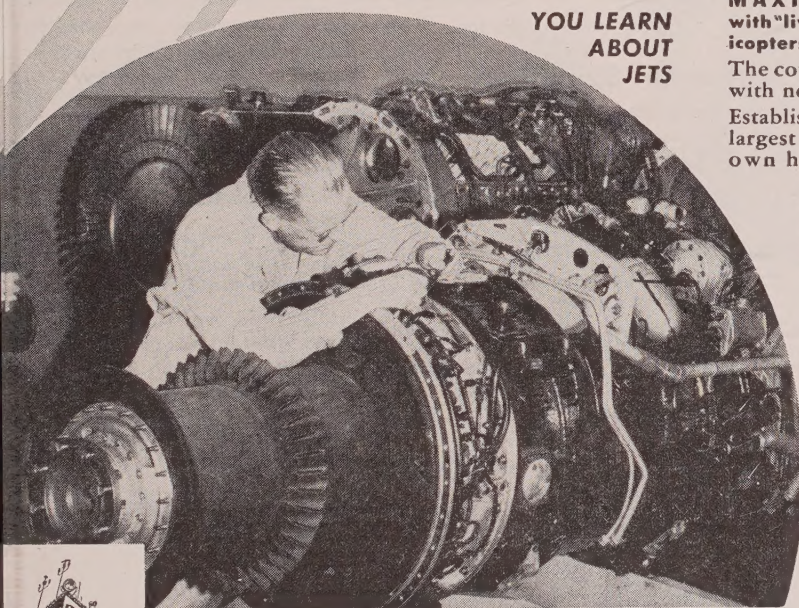
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SKYWAYS

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"props" are tops for training

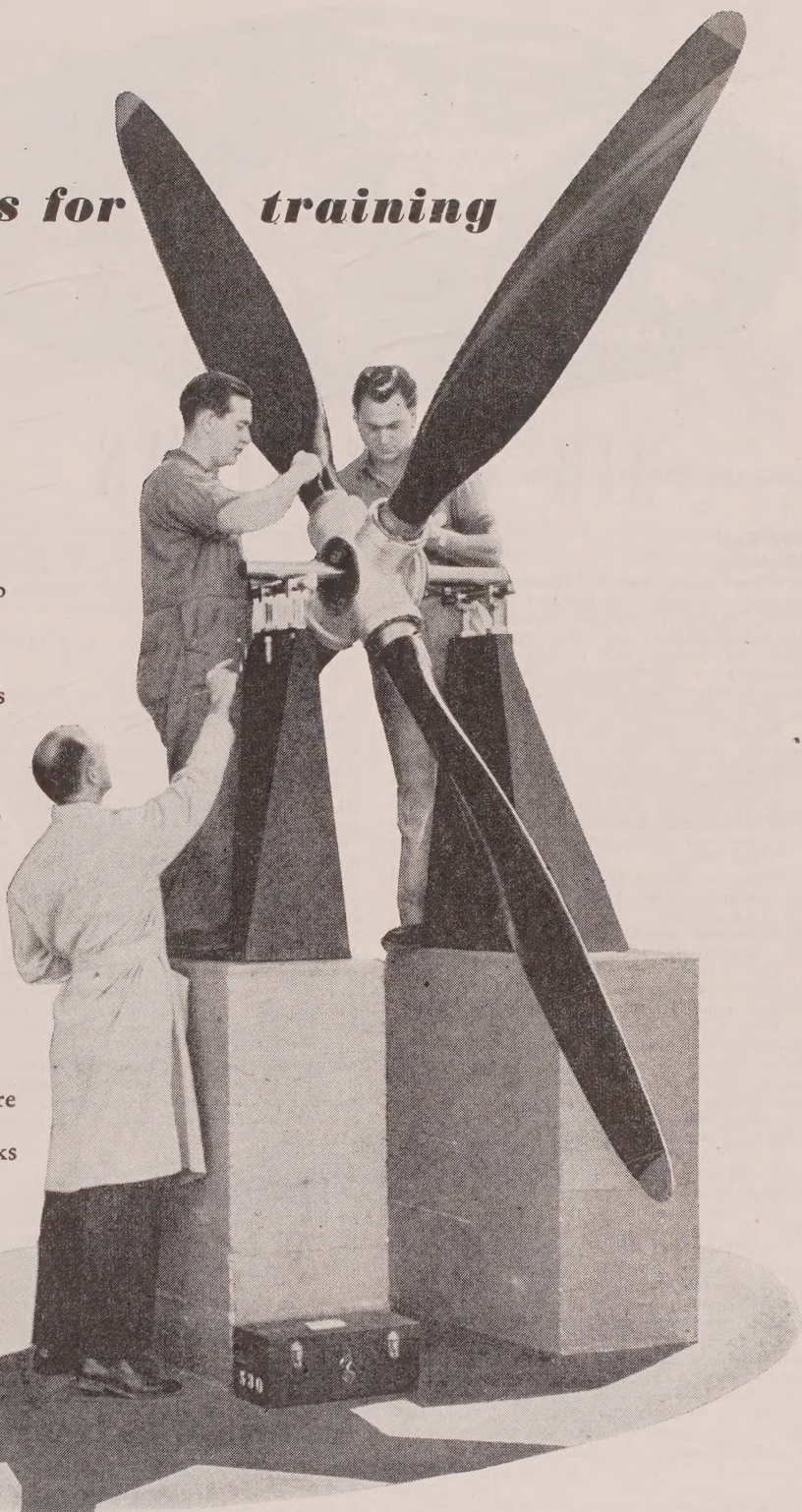
The big multi-blade propeller could mark a scene in an airline overhaul base. The men might be certificated A & E mechanics. Actually, as Mechanics course students at Northrop Aeronautical Institute, they are putting the finishing touches to a propeller overhaul job, under an instructor's guidance.

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AIR YOUR VIEWS

Bad Deal

Gentlemen:

Flying across central Wisconsin recently, I stopped overnight at a middle-sized town with a fine airport. A courteous attendant came forward, and because he looked smart enough to know his business and because I had friends waiting for me at the gate, I instructed the attendant to taxi my plane over for service and to tie it down for the night.

During the night a thunderstorm hit the town and the next morning when I went out to the field to take off I found:

1. Attendant had left the master switch on.
2. He had tied ship down so tightly that the subsequent drying and shrinking of the tie-down ropes exerted a negative stress on the wings.
3. He had failed to secure the control wheel with the safety belt to prevent buffeting of the ailerons.
4. He had reversed both the gas filler caps, leaving the vents pointing backward.

Isn't it time for a federal law that would prevent a person from servicing aircraft for pay without some elementary knowledge of airplanes?

What I have in mind is a simple CAA examination that would require a service man to know why gas tanks should not be left half empty, how to check for water in the gas, why the position of the vent pipes is important, how to secure the controls, what weight of oil is indicated for various motors at various seasons, why not to lift or push in moving an airplane, why wheel pants were not designed as step ladders, how to tie down a plane, etc.

The A&E examinations are rigid and adequate, but we desperately need some competency in ordinary aircraft service men. The dumb attendant at an automobile filling station usually causes no more than a little roadside grief for the motorist. But the dumb airport grease-monkey can kill the customer.

I seriously believe that the CAA should move promptly into this breach, require suitable simple examinations, and issue the proper certificates. Fees should be no more than \$1, and the exam should be so phrased that any intelligent man with proper know-how can pass without regard to his education. But for heaven's sake, let's keep the knuckle-heads away from airplanes!

J. L. JONES

Tulsa, Oklahoma

Thank you for your letter, Mr. Jones, and for your certificate-of-competency idea. We like it and are passing it along to the CAA for comment. Fortunately, most service operators realize such inefficiency would soon put them out of business and so they've watch-dogged the actions of field attendants. Apparently, however, there are still some operators who flunk out on service. Send us the name of that field and we'll check it with the NAA list to see what rating, if any, it was given.—Ed.

Plane Information

Gentlemen:

While glancing through an old issue of your magazine I happened to run across a picture of the Aero Flight Streak. I remember hearing about

this plane some time ago, but have forgotten the details. Can you give me any information on it, and whether or not it will ever be marketed?

Also, I noticed the Swift, pictured in the October issue, has its NC numbers in reverse on the left wing. How come?

R. J. CONNELLY

Richland, Wash.

Latest report we have on the Streak is that the builder is making some changes in engine specifications. Exactly what those changes are we don't know, because nothing official has been issued by the Aero Flight Aircraft Corp. According to our old specs, the ship is powered by 85-hp Continental engine, has top speed of 175 mph, cruises at 165 mph, has maximum range of 700 miles. It is a low-wing two-place all-metal monoplane with retractable landing gear. Another version is powered by 125-hp Continental, has top speed of 203 mph, cruises at 192 mph, has range of 600 miles, and is identical to the 85-hp Streak except that it is three inches longer. Whether or not it will ever reach the market, or if it does, when, is something no one knows. The ship has created so much interest, however, that we feel there is a market for it and sincerely hope it will get into production by early spring. As for the Swift with its NC numbers in reverse, we checked back on the original picture, issued by the CAA, and discovered that the photographer who'd made the original print printed the picture in reverse. Your eagle-eyes were better than ours.—Ed.

Gentlemen:

I've been trying locally to get some information on three different aircraft, and have had little or no success. Perhaps you can supply me the correct data. The ships are: Culver Cadet, Culver V, and the Culver PQ 14.

CHAS. T. HOWLAND

Davis, Calif.

The Culver Aircraft Corporation went out of business shortly after the war. In 1946, I think. The Culver PQ-14 was a radio-controlled Target Drone built for both the Army and Navy (Navy version designated TDC-2). It was a low-wing ship powered by 150-hp Franklin engine. It had a top speed of 180 mph (without pilot), cruised at 165 mph and had a range of 594 miles. We have no record of its performance when flown by a ferry or safety pilot. The Culver Cadet also was a low-wing monoplane. It was powered by 80-hp Franklin engine, had top speed of 140 mph, cruised at 120 mph, and had a range of 600 miles. It seated pilot and one passenger side-by-side, and had retractable landing gear. Back in 1942 and '43 when this ship was built it was considered one of the fastest personal planes on the market. The Culver V was the postwar version of the Cadet. It was powered by 85-hp Continental engine, had cruising speed of 125 mph, range of 700 miles, and employed retractable gear. Interesting feature of the ship was its so-called "Simpli-Fly" system which consisted of a gear which linked the elevator trim tab to the flaps, thus automatically establishing proper setting for take-off, climb, approach and landing. Soon after this ship was introduced, however, the Culver Aircraft Corporation went out of business. Too bad.—Ed.

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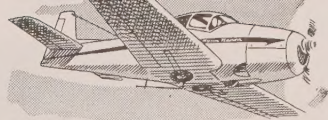
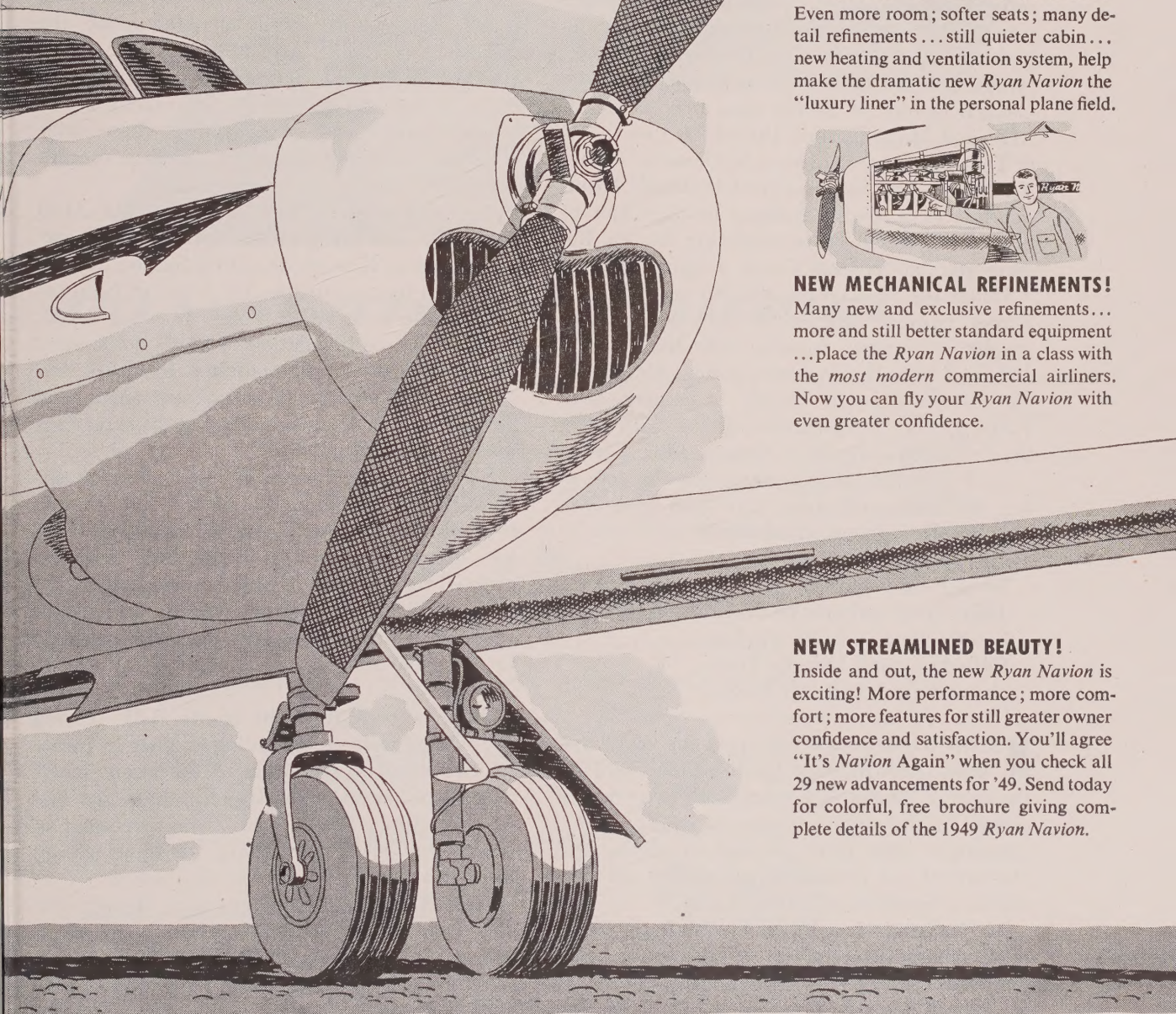
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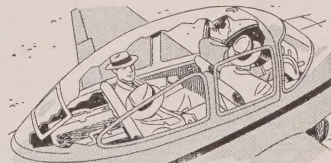
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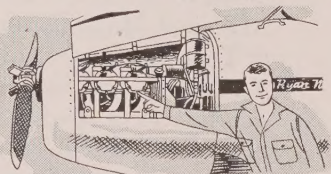
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USAF NEWS



USAF's Air Defense and Tactical Air Commands have been combined under a newly organized Continental Air Command in a move designed to strengthen the Air National Guard and Air Reserve Programs and to provide for Air Force command areas identical with those of the Department of the Army. Lt. General George E. Stratemeyer is CG of the new command. Major General Gordon P. Saville takes over as CG of ADC and Major General Robert M. Lee as CG of TAC. Lt. General Elwood R. Quesada, former TAC chief, has been assigned to USAF Headquarters as a special assistant to the Chief of Staff. His job will be to accelerate the Air Reserve and Air National Guard programs.

Under the new set-up, the 9th and 12th Air Forces, formerly assigned to TAC, become geographic Air Forces, together with the 1st, 4th, 10th, and 14th. Headquarters of the 14th is being moved from Orlando, Florida, to Langley AFB, Virginia, and headquarters of the 12th from March AFB, California, to Brooks AFB, Texas.

As a result of this reorganization the following Air Force and Army command areas will have identical geographical limits:

- First Army and 1st Air Force
- Second Army and 14th Air Force
- Third Army and 9th Air Force
- Fourth Army and 12th Air Force
- Fifth Army and 10th Air Force
- Sixth Army and 4th Air Force

MARRIED men may now apply for USAF aviation cadet training. Qualified men between the ages of 20 and 26½ years, with two years of college or the ability to pass an equivalent examination, with good physical condition and high moral and personal qualifications are now eligible, regardless of marital status.

Air National Guardsmen can also get USAF pilot training as a start to a flying career with the ANG. Under a new plan approved by USAF, Air Guardsmen who complete the 52-week aviation cadet course will be required to serve only one year with USAF before returning to their original ANG unit. Officers will retain their Air Guard status and grade while in training; airmen will be trained as Aviation Cadets. First cadet class open to Air Guardsmen starts on

March 1. Eligibility requirements are the same as for other applicants.

THE AF has announced that women specialists without prior military service may now apply for USAF Reserve commissions. (Women with prior service have been eligible under the provisions of Public Law 625, 80th Congress.) USAF said that this action was being taken in order to increase the number of qualified professional and technical personnel whose skills could be converted quickly to military specialties in the event of an emergency.

Applications must be made on WD AGO Form 170. You can get these forms at the nearest Air Force Base or recruiting Station, or you can write for one to the Air Adjutant General, Headquarters, U. S. Air Force, Washington 25, D. C. Air Force Regulation 45-15, dated November 9, 1948, should be consulted to insure that all necessary information and papers accompany the application. All applicants must have reached their 21st birthday.

Former commissioned officers of all the women's services, including the WASP, are eligible to apply for Reserve commissions. WASP service, except for periods of training, may be counted for purposes of appointment only.

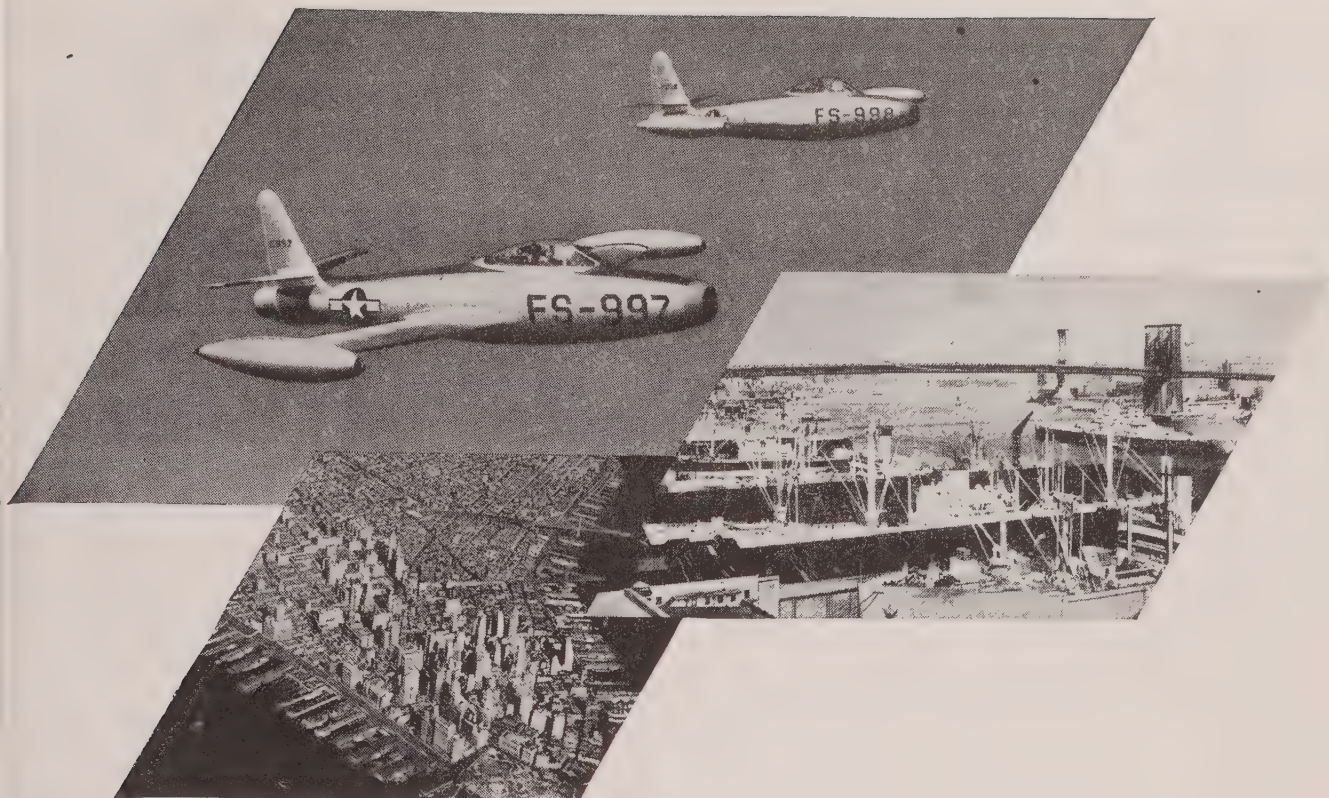
Applicants, upon request, may be brought on active duty for a three-year period if qualified for available assignments.

USAF is converting 10 of its B-35 "Flying Wings" from reciprocating engines to turbo-jet engines. The B-35, first of the large "wing" aircraft produced in the United States, was first flown in June, 1946. It was the predecessor of the B-49 all-jet "Flying Wing", 30 of which are on order.

A \$6,500,000 contract has been signed with the General Electric Company for the manufacture of fire control systems for USAF bombers.

Production of the fire control systems is expected to get under way within the next three to five months at the former Remington Rand plant in Johnson City, New York, which has been leased from the War Assets Administration by General Electric to fulfill the Air Force contract. Production facilities for the plant are being furnished by USAF.





THUNDERJETS OVER AMERICA

Daily . . . from well staffed, busy fields of the U.S.A.F. throughout the country
 squadrons of new Thunderjets are in operation . . . ¶ Proven in service . . .
 and now being supplied in ever increasing numbers
 their greater range . . . speeds of over 600 M.P.H. and
 tremendous fire power are the obvious warnings to aggressor nations.



¶ Thus the Air Force
 centers of population.



assures protection to our greatest
 The metropolitan area which

houses the life line of two thirds of the world's financial markets . . . and the greatest

seaport on the face of the earth . . . New England's harbors of the fishing

trades



heavy

and inland . . . the many productive farms . . . and the

industries which turn out everything from cotter
 pins to high speed bearings. ¶ All are in turn part of the treasure trove whose

safety is assured only through the growing acceptance by the American people

of the vital need for a modern dominant air force . . .



Republic Aviation Corporation, Farmingdale, L. I., N. Y.

"This is the year of the Thunderjet"

REPUBLIC AVIATION



Makers of the Mighty Thunderbolt • Thunderjet • XR-12

NAVAL AVIATION

JET PILOTS are as happy about the first successful self-starter for jet and turboprop engines as grandpa was when he could throw the crank away on the old high wheeler. Instead of waiting for the auxiliary power cart to be wheeled up for a start, pilots will now be able to press a button in the cockpit. A storage battery and $\frac{3}{4}$ -hp motor start the new starter which is a radial inward-flow gas turbine. The unit provides more horsepower per weight and size than any previously developed powerplant. Weighing only 88 lbs, it puts out 65 horsepower. The Air Research Manufacturing Co. of Los Angeles and the Bureau of Aeronautics proudly unveil their newest mighty-mite.



THE *Cutlass*, Navy's new tailless jet fighter, is unlike any aircraft seen in the U. S. to date. In flight it resembles a giant arrowhead. On the ground it looks like a huge guided missile with oversized fins. The word radical is too conservative to adequately describe its design. Its lack of a tail is the most unusual feature, but its swept-back wings are the most interesting. In their trailing edge are set the controls normally found in a tail. There are two vertical stabilizers and rudders, but longitudinal and lateral control are provided by a pair of "ailevators" or "elevons" which are, at the same time, ailerons and elevators. There are no flaps. Leading edge slots are extended to delay the stalling point and increase wing life at the relatively low speeds necessary for landing aboard carriers. For reducing speed rapidly in fighting maneuvers there are speed brakes in the trailing edge. The *Cutlass* is in flight attitude when standing on the deck. It sits so high on its tricycle landing gear a short man can walk under the wing without stooping. Everything in its design is there for speed. There are two Westinghouse turbo-jet engines. Added afterburners produce large increases in thrust when tactically needed. The pilot's seat is of the automatically ejectable type. All controls are operated by hydraulic power to overcome the tremendous forces brought on by high-speed flight. How fast will it go? The Navy won't tell, but it believes the *Cutlass* will prove faster than any operational jet fighter flying in this country today.

A NEW Naval Air Station for reserve training has been established at Municipal Airport, Lincoln, Nebraska. There are 42 aircraft with a permanent personnel complement of 12 officers and 130 enlisted men. Present plans call for training "week-end warrior" reserves numbering 139 officers and 598 enlisted men. Interest among Nebraskans is so high, increases in these complements are expected. Commander L. S. Meinsom USNR is C.O. of this 26th Naval Air Reserve Station to be established.

GORGON IV has joined the fast stepping family of jet-propelled missiles developed by the Navy. Radio-controlled, tracked by radar, powered by a ram-jet engine, the new Gorgon has made several sustained controlled flights of more than 10 minutes. It is an all-metal high-winged monoplane, 22 ft long with a wing span of 10 ft. Slung beneath it is the circular stove-pipe engine 7 ft long. Since the ram-jets have no static thrust they cannot get off under their own power. Necessary velocity for launching is given by the mother plane under whose wing Gorgon IV nestles until sufficient speed is attained for the drop. Ram jets are the fastest of the jet powerplants. The Navy's first attained a speed of 1500 mph over two years ago. The one in Gorgon IV is prevented from passing subsonic speeds by specially designed drag-brakes. Developed by the Bureau of Aeronautics, the Gorgon series, started in 1943, proved to be the first jet-propelled guided missiles designed, built, and flown in the United States. Their amazing powers would give nightmares to the frightful winged serpent-haired monsters for whom they were named.

BY REQUEST of D. S. Rentzel, Civil Aeronautics Administrator, a naval officer "with a broad understanding of aviation needs, outstanding administrative ability, and expert technical qualifications" has been assigned for one year's duty as his Special Assistant. The duties of electronics engineer Capt. Charles F. Horne USN will be concerned with CAA program for all-weather navigation and landing systems. Prior to his new assignment, Captain Horne was Deputy Chief of Naval Communications.





Designers
and builders
of
AIRCRAFT

★ ★ ★

GRUMMAN PANTHERS

These newest Jet Fighters for the U. S. Navy, developed for increasingly high performance, operate from either land or carrier bases. Notable innovations in their rugged construction permit unusually short take offs and landings and include marked advancements in the design of wings and cockpit.

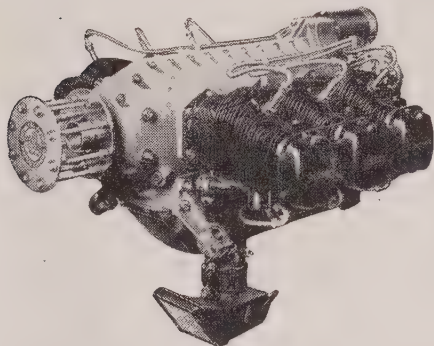
GRUMMAN AIRCRAFT ENGINEERING CORPORATION, BETHPAGE, LONG ISLAND, NEW YORK
Contractors to the Armed Services

Continental Service ... near as your nearest airport!

The greater the owner's dependence on his airplane, the more vital it becomes that repairs and replacements be at hand when they are needed. That is another reason why so many who use their planes for business standardize on makes with Continental power.

They know that wherever they fly, Continental Motors service will be there ahead of them. Continental Motors has accepted the obligation imposed by the steadily growing use of planes, and is constantly enlarging and improving its service.

The coast-to-coast network of Continental stations is now backed up by two new master parts depots,—at Los Angeles and Dallas—and service headquarters at Muskegon has been reorganized and streamlined for faster delivery of parts. For Continental knows the part that service has played, and is playing, in making Continental engines fliers' first choice.



Foreign service

The Continental C125 has been adopted for many of the personal and executive planes now being designed or manufactured in Europe, Asia and South America.

To maintain these planes, and the thousands that have been exported, you will now find Continental parts and service in almost every free country of the world. This reflects the world-wide acceptance of Continental engines as the most efficient and dependable source of power.

Continental Motors Corporation

MUSKEGON, MICHIGAN

CONTINENTAL



PROP WASH

Aero Oddities

E for Eager. Shortly after take-off on first plane ride, worried woman passenger asked pilot if he was sure they had plenty of gas. When he asked why she doubted it, woman passenger pointed to instrument on panel. Pilot calmly explained it was ship's compass—the "E" meant they were flying in Easterly direction. (Mrs. J. R. Hackbarth, Joplin, Mo.)

Aerial Thumber. While making leisurely X-C to build up flying time, pilot noticed he was being vigorously waved at by boy in a field. Thinking something wrong, pilot landed ship in field, asked if he could be of help. Boy announced he was on his way to town on foot and merely wanted a ride. He got it. (M. F. Gabriel, Shelby, Nebraska)

Lost, Strayed, or Stolen. Absent-minded Army corporal recently learned plane lost in hayfield could be as hard to find as needle in haystack. Enroute to visit friends in another section of U. S., an Army corporal in private plane was forced down in farmer's field by bad weather. Farmer helped him tie down ship, then drove boy into town so he could get bus to his nearby destination. When Army corporal returned few days later to pick up plane, he couldn't find it and couldn't remember farmer's name. Corporal rented another ship and searched for missing plane from air, but still couldn't spot his ship. On way back to airport, however, he was attracted by mirror signal. It was the farmer who'd sheltered the boy's plane. (B. Baer, Dayton, Ohio)

Note Quite Clear. After ship had climbed to 3,500 feet, instructor told student to clear himself. Still not familiar with aeronautical terms, student reached for his hanky,

vigorously blew his nosel (T. Estes, San Mateo, California)

Ingenious. Pilot on X-C was caught in area of bad weather and accompanying clouds. Not having proper instruments nor any instrument flying experience, pilot fastened string around center of candy bar, suspended it from bracket in cabin roof, used it as bank-and-turn indicator and got down into airport safely. (W. Sutter, Geneva, Switzerland)

No Hits, No Runs, Two Errors. Airport manager went out to greet incoming Cessna, pilot of which ignored two perfectly good runways and came in on an alfalfa field "back of the barn". After manager directed touchy taxi operation back to field, pilot and passenger sheepishly crawled from the ship. They were two CAA representatives on tour of airport inspection! (J. P. Hartzler, Jackson Center, Ohio)

Welcome Visitors. Pilot was forced down in farmer's field when plane's engine conked out. When ship stopped rolling, farmer and his wife rushed up to pilot, shook his hand almost off, then exclaimed they'd kept the field in good condition hoping some "flyin' feller'd have to use it some time!" (J. V. Stewart, Petersburg, Va.)

Att'n Readers:

If you have any news note oddities pertaining to aviation, send them to SKYWAYS, Box 17, 444 Madison Avenue, New York 22, N. Y. Five dollars will be paid the sender of each "oddy" printed. Contributions cannot be returned unless accompanied by stamped addressed envelope. The decision of the editors is final.

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COMBAT COMMUNICATIONS and every type of liaison required in air-ground combat have been tied into one mobile channeling unit, called Tactical Control Center. Men on phones handle incoming info, pass it on to men at plotting board who set up markers giving complete picture of attack, or defense, over thousands of square miles

COMBA



THE MEMORIES of war have become a little hazier with time. The filth and terror have receded into the backgrounds of minds, and less disturbing thoughts coat the rawness of past dreams.

Some pin-pointed mental pictures, however, will never give way: the horror of troop carrier planes bracketed by their own ack-ack; patrol boats off an island coast blasted by friendly fighters diving out of a high sun; or the sight of a stick of bombs straddling a forward observation post—on the wrong side of the line. These are the scenes that remain, blanking out others—more pleasant by wartime's peculiar scale of values—of strong points strafed yards ahead of advancing troops and beachheads secured by comforting sky cover.

If the war memoirs serve just one useful purpose, it might be to emphasize that uncertain communications were the frequent causes for many of the missed connections in the heat of battle. In some cases liaison information was deliberately ignored or carelessly overlooked on the command level and proper orders thus never sifted down to field units.

Out of the tragedies of downed troop carriers, the sunken patrol boats and the bombed infantry, has come a new, more closely knit method of air-ground communications designed to insure more positive air-ground support and protection than was possible with non-integrated

TAC Control is nerve-center that directs all attack and defense

By JERRY LEICHTER

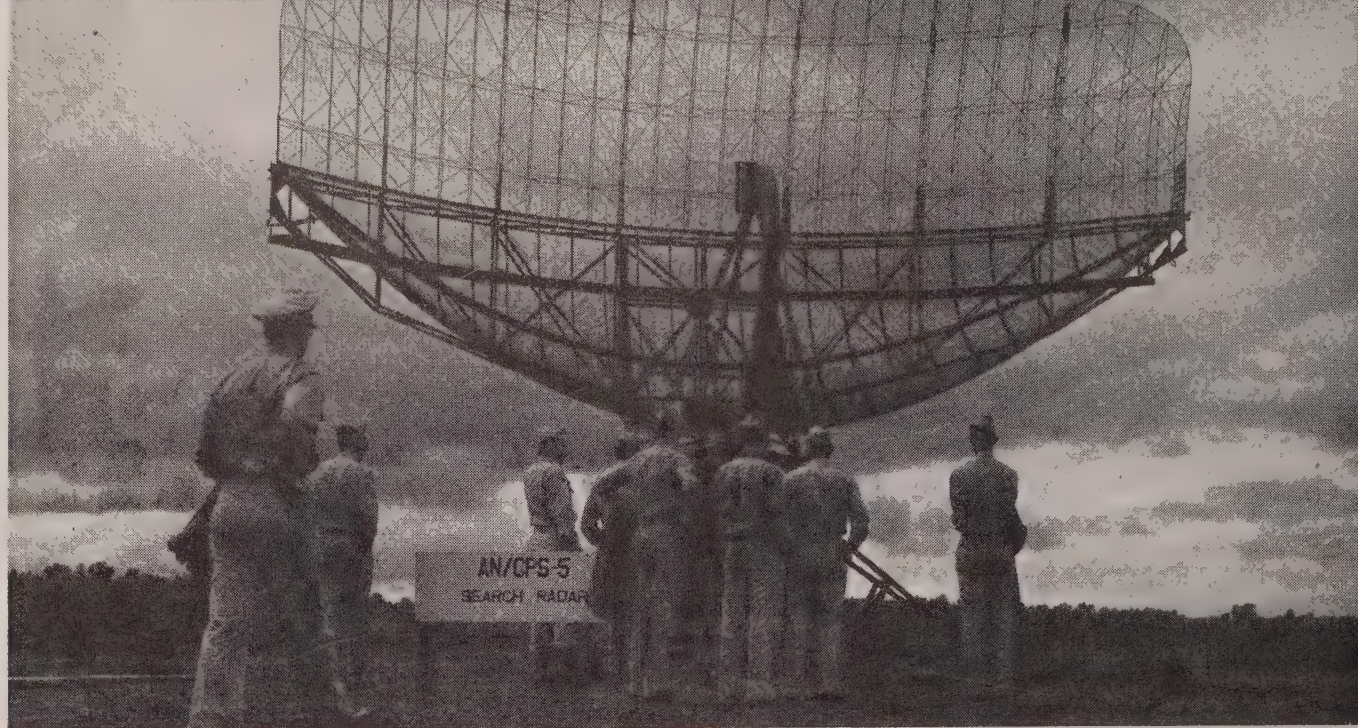
communications during much of the past war. If improved radar and radio combined with alert observation can do the trick in any future emergencies, the men in the field can be sure that the planes will come over on time and do their jobs exactly where they're most needed. Informa-

tion of success or non-success in attack and defense will also channel back to command levels faster than heretofore.

For the first time, all forward and rear echelon combat communications have been tied into one mobile channeling unit, including every type of liaison required in air-ground combat. There is nothing radically new about the operations of the Tactical Control Center of the Ninth Air Force, Tactical Air Command, but the set-up derived from the bitter lessons of war should mean that the next time U. S. military units have to take to the field, a mobile central agency, controlling thousands of square miles of territory, will be solely responsible for aircraft liaison in an entire Air Force theatre, both on attack and defense.

The Tactical Air Command is out to demonstrate that with a central brain controlling all combat nerve centers, the factors that led to local disasters on some Pacific islands, allowed the Bulge to expand and caused bitter recriminations in Italy, among other combat foul-ups, may be a thing of the past. The success of the control center technique has been proved re-

CONTROL...BY RADIO



SEARCH RADAR scans skies, as demonstrated here, for traces of enemy aircraft. This info is relayed to the mobile unit

peatedly over the past year in combined maneuvers which involved Army, Navy, Air Force and Marine contingents operating together with split-minute precision in mock wars.

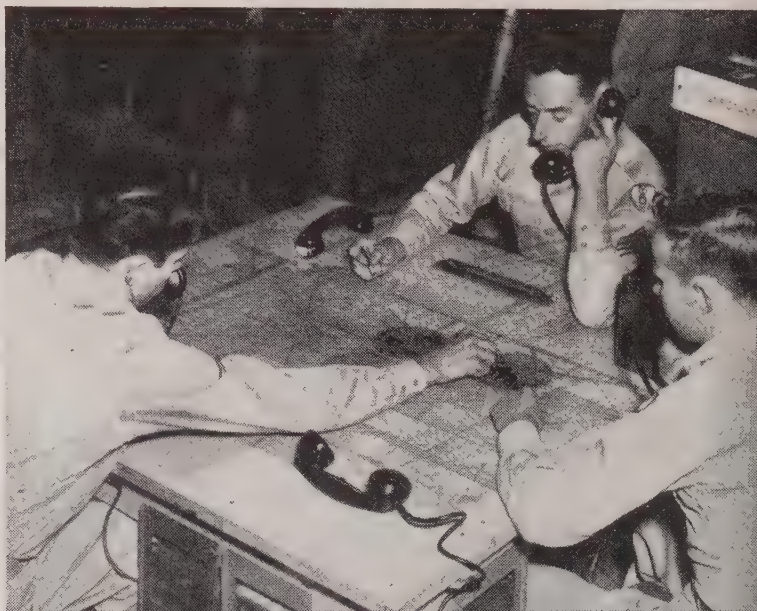
The Tactical Control Center, relying on high frequency, very high frequency and frequency modulation radio channels, coordinates reports from various radar and radio observation posts for staff observers and transmits official mission orders based on the information and requests received from an area usually up to 125 miles deep and 100 miles wide.

Imagine a typical wartime center (Battle of Britain defense style) with its plotting board centered on a small amphitheatre floor. The tiers of seats are filled with men handling incoming messages which are relayed to the floor

by interphone, resulting in the movement of little markers on the map-surfaced plotter. Trained observers gauge the marker movements, which might represent friendly or enemy land, sea and air units in the area covered by the map, and relay information back to and from the commands most concerned. The new tactical center works on the same principal and is set up in somewhat the same fashion, but it is fully mobile and may change its location as tactics demand.

One Tactical Air Force group, normally of over 1,000 men, is responsible for the operation and maintenance of the entire message network and main center headquarters. At present, the 502nd Tactical Control Group, activated at Biggs Air Force Base, Texas, in December, 1945, and now stationed in (Continued on page 46)

OFFICER gives ground-to-air instructions via radio-control jeep, to close-support attacking aircraft. This info is plotted on board when received at Tac Control Hq.





HANGAR FLYING—Whenever and wherever pilots get together, you'll hear tales of daring and danger . . . some true

Plane Parrots

By LATANÉ LEWIS

THE AIRMAN sitting opposite the Dodo in the airport office was expatiating on his breath-taking experiences.

"My narrowest escape?" he said. "Well, I'll tell you about it." He blew a cloud of cigarette smoke and settled back.

"There I was, caught in a pea-soup fog, with no radio, no parachute, a bad altimeter and mighty little gas. Nasty position to be in, yes sir! I buzzed around, feeling for the ground, and didn't know when I might fly smack into it."

The neophyte leaned forward, his eyes wide. "Jeepers!" he exclaimed.

"Well, that isn't exactly the word I said at the

time," the hero chuckled. "Fellow gets a bit provoked by such a situation, you know. I spent a nasty hour before I found a hole in the over-cast. Luckily, it was right over the airport.

"After I landed, they told me that I had unknowingly flown under a bridge—a low one with only a few feet clearance! Can you beat that? I tell you, the Lord certainly must have taken over the controls!"

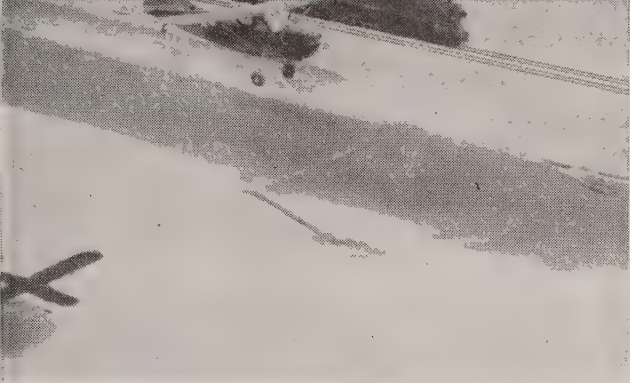
The new cadet was enthralled. He looked at the flyer with the admiration of a child.

I wanted to run right after him and tell him that, as an aviation writer, I had heard his hero's story told as a personal (Continued on page 51)

It. putt-putts



GROUND CREW checks over VMO-6 plane at Camp Pendleton, Cal. Fuel man is PFC Edw. Sanders, with him is Sgt. Frailey



MARINE CORPS Observation planes were used to scout rail lines for hazards in Communist-threatened China in 1947



PICK-UP RIG, as demonstrated here by Capt. Brown, VMO's Squadron Commander, was recently devised by Capt. Brown

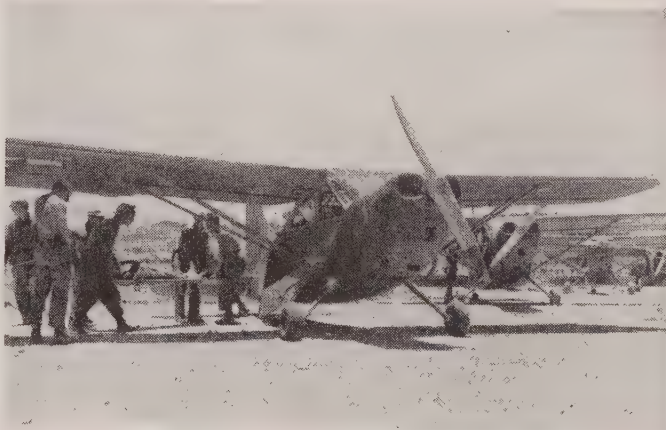
By PFC A. E. WILLIAMS, USMC

"LIEUTENANT Putt-Putts" in their Grasshopper-group "Maytag Messerschmitts" are today employing the same tactics used during World War II, but their peace-time missions are more varied. Versatility, though it may not be stressed, is certainly the by-word for today's Marine Corps pilots and their tiny planes.

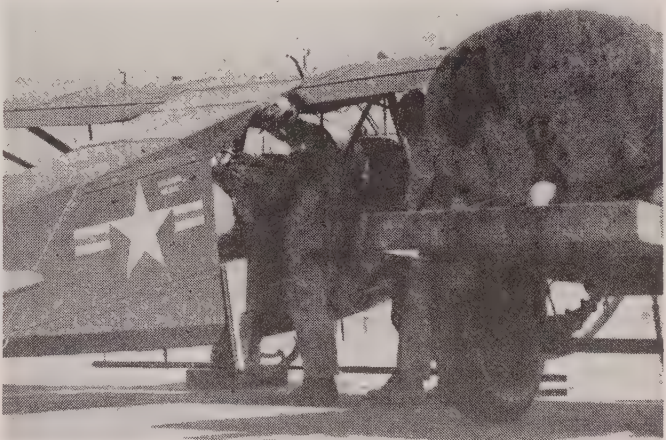
Rushing to the scene of a dangerous forest fire to direct the fire fighters by radio and walky-talky, the planes are on the scene to evacuate the wounded from the inaccessible ravines or canyons where the fires make other means of removal impossible. Disregarding danger, the Leathernecks' OY-1's are on the job, helping out when and wherever they can.

At Camp Pendleton, Oceanside, California, the OY-1's of VMO-6, are used to spray DDT and fuel oil mixtures over thousands of acres of infested pools and canyons—thus keeping to a minimum mosquito breeding and the possibility of spreading diseases.

One of the most recent tricks now in use by Pendleton's Observation Group is a message or bundle pick-up device, used while in flight. The idea was introduced (Continued on page 47)



WORLD WAR II proved utility of grasshopper planes. During Battle of Okinawa, planes flew wounded to hospital



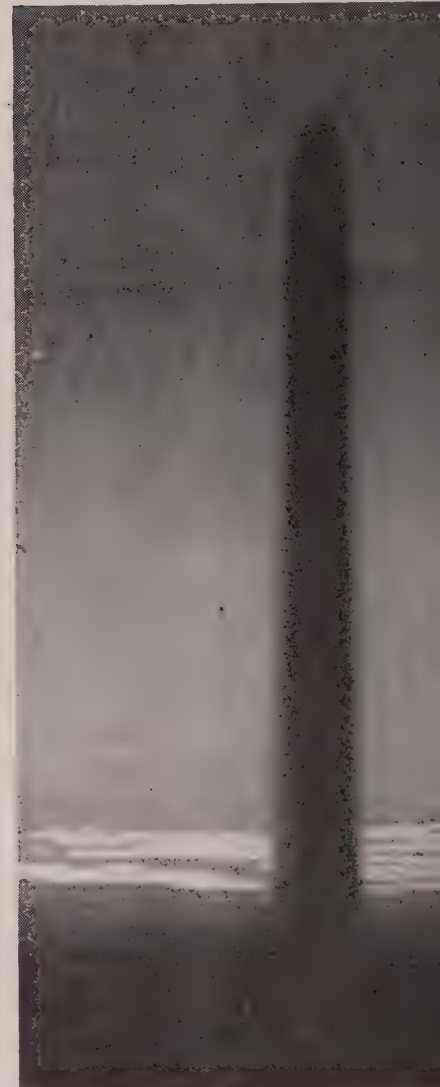
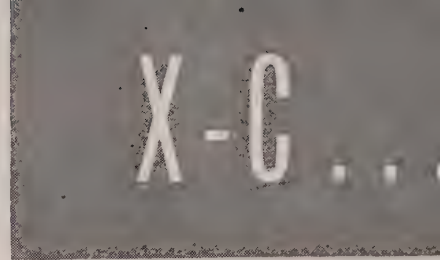
ROUTINE JOB done by VMO-6 is DDT-ing the post. This job is done every day. Ship's 39-gallon tank provides 20 minutes of spraying. Military version of three-place personal plane (below) is as busy today as during the war

GRASSHOPPER GROUP shown here include pilots and observers who took part in the battle for Peleliu in Pacific





GAS STOP—With darkness sneaking in all 'round, the Navion took off from the airport at Prescott, Arizona, the last daylight stop for a good plane check



SUNSET—Looking back over the tail of



*Three private pilots
get their first crack
at night - flying X-C
with SKYWAYS' Pilot
as the check - man*

By DON DOWNIE

Dusk to Dawn



tion at 11,000 feet, we could see the sun fading in the west

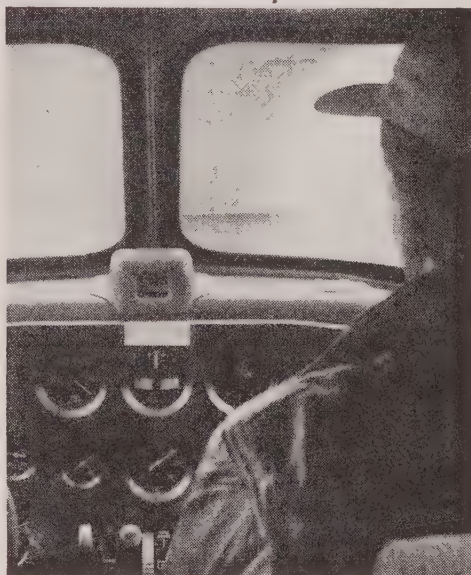
"SHUCKS, this is a cinch," said the Doc. Outside the cockpit, the scattered lights of Texas towns twinkled in the moon-drenched darkness. It was the first night flight for two private pilots and one student pilot selected by SKYWAYS for a new experiment in aviation reporting.

Take the average private pilot with a qualified instructor and report what he learns as he learns it. This will be night flight, as seen for the first time by three "flying guinea pigs."

Our three pilots, all from Southern California,



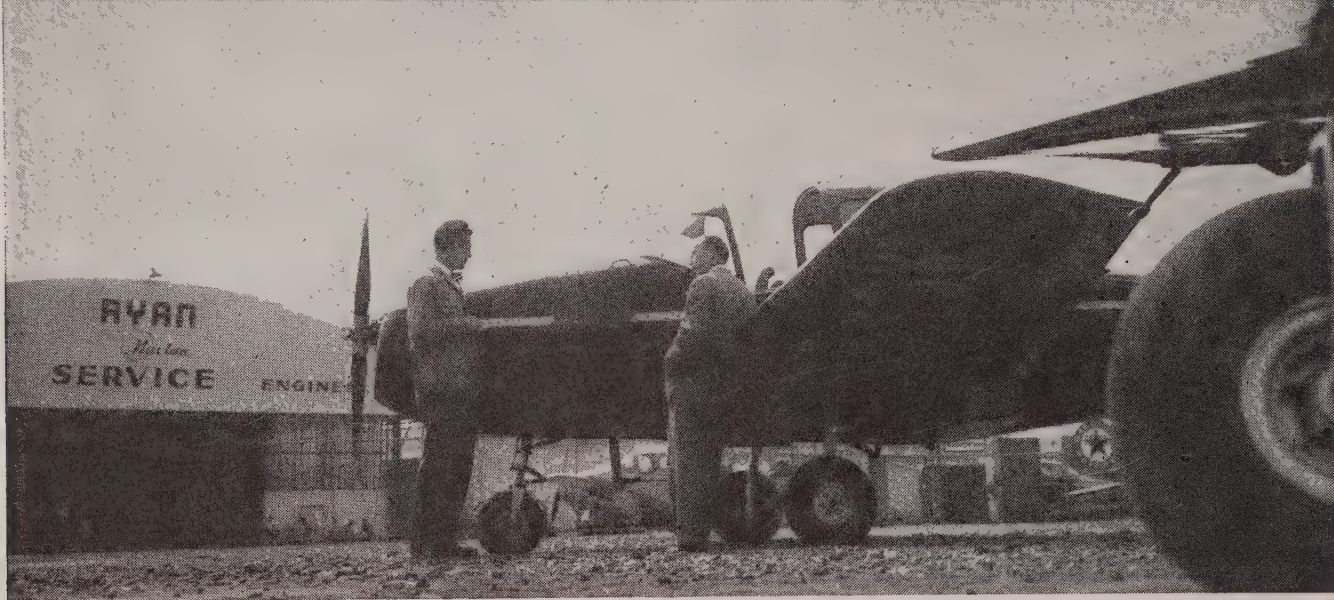
KANSAS CITY—Ferry flyers landed at Kansas City at 2 a.m. and then had to wait two hours to get the ship refueled



ST. LOUIS—Dr. Richardson was at controls as the ship nosed into the dawn just west of St. Louis. Flying the light line ended right here

HARRISBURG—Early morning sky was overcast as the Navion winged its way toward its destination: Reading, Pa.





TAKE-OFF on the over-night ferry flight across the U. S. was from Ryan's field at San Diego. Before they left, Ryan's test pilot "Doc" Sloan (below right) gave Pilot Downie a you're-heading-into-darkness-and-cold wave-off

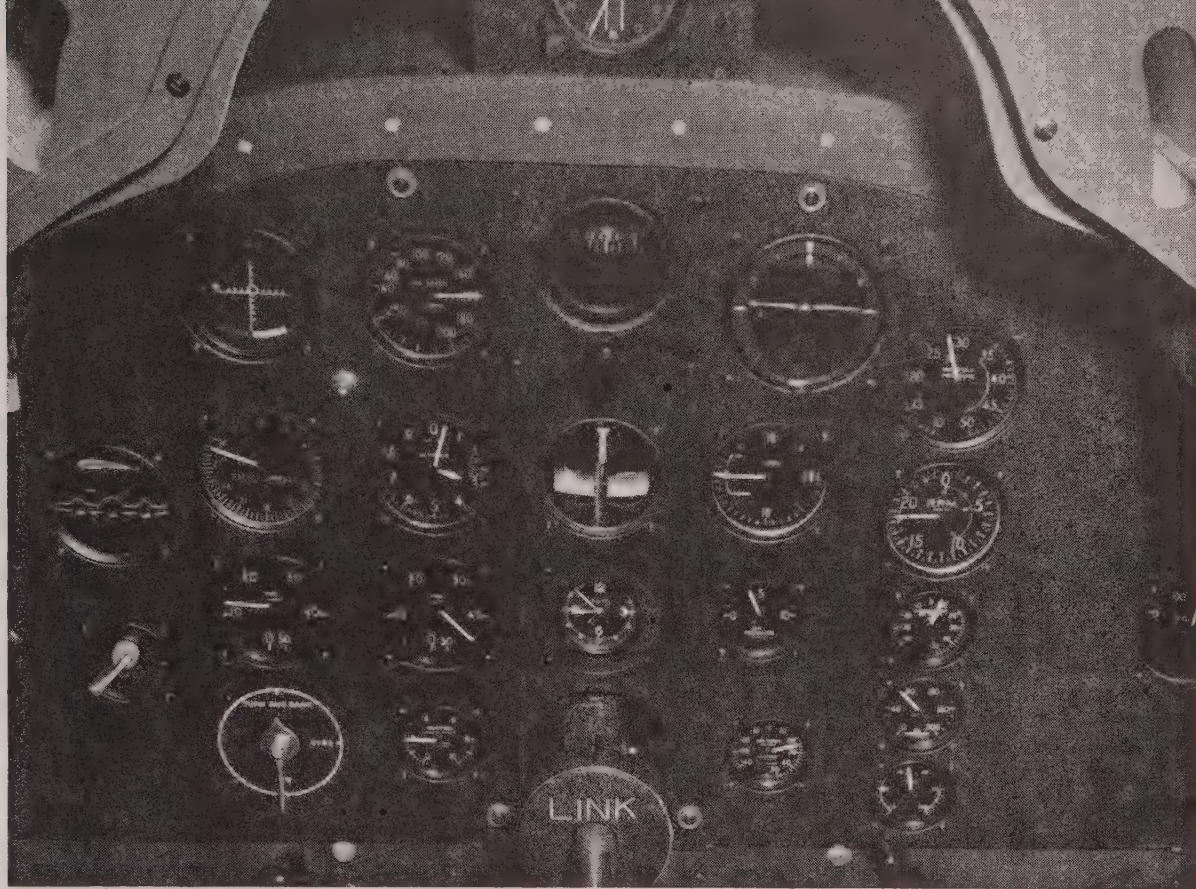
were Dr. Arthur Richardson, George Rex and Bob Coffey. Both Richardson and Rex have owned *Cubs* and surplus PT's, while Coffey, the student pilot, had flown only in rented ships. Total logged time for Richardson and Rex was about 300 hours at the time of this experiment while Coffey had flown only 100 hours. The fourth man in the ship was yours truly who's had many hours of night flying—and likes it.

This flight was made in a brand new Ryan Navion (N4526K) during a delivery flight from the San Diego factory to Aviation Consultants in Reading, Penna. Special night and on-top insurance was arranged by SKYWAYS to cover this unusual experiment. The trip was arranged for a week-end when a full moon would be shining to give the neophyte pilots a little break in their transition to (Continued on page 48)



DESTINATION reached, Downie (kneeling) and Dr. Richardson unload luggage at Reading field, successful experiment over





INSTRUMENT TRAINING at the pilot indoctrination school called for time under the hood and three GCA'S in one session

Go 'Round Again...

By T. H. COLLINS

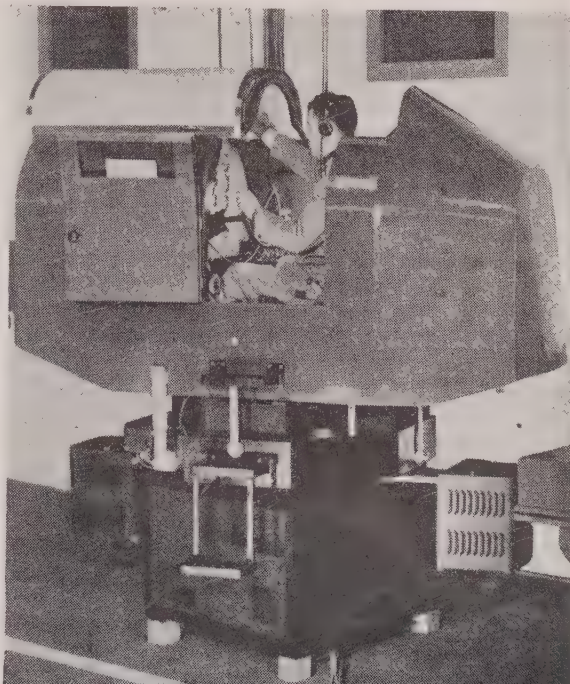
RALPH KARNES and I were sitting in his large-windowed office on the second floor of the Municipal Airport building. We weren't talking much. Just a little desultory conversation as we watched the DC-6's land and take off. Ralph, in charge of a pilot indoctrination school for a major airline, broke off in the middle of a comment about something or other, and pointed out the window toward a figure walking across the ramp. "There goes the walking personification of a pilot's bugaboo—imagination!"

I lit a cigarette and waited for the story.

"You know how the school works here, Jim. We take these kids, most of them former Air Force pilots, give them six weeks training, then shove them into a co-pilot's seat. They're generally pretty good pilots when we get 'em—but better, we hope, when we get through with 'em.

Nodding again in the direction of Mr. X, Ralph continued, "Well, this fellow—Bob's his name, started in the class about three weeks ago. Just out of college. (Continued on page 61)

INSTRUCTOR put the pilot in the Link, wound up the gas gauge to indicate an hour's supply, then put the hood down





SOARING CHAMP Paul MacCready watches bail-out instructor Bushman transfer pilot chute to the main chute he'll wear for first jump. Ship used for practice jump was Cub Cruiser (above) with the door removed for easy exit.

First Bail-Out

GERONIMO . . . and out he goes. This jump was made over the Puente S. Ranch near Los Angeles. Where MacCready may have to jump is at Death Valley.






WHY MAKE a chute jump if you don't have to? Paul MacCready, current National Soaring Champion, hopes to break all existing altitude and distance records this spring in flights from Death Valley, California. To garner these new marks, he will necessarily fly his lightweight "Orlik" sailplane through some extremely turbulent air. He will ride on a parachute, and there is a good chance that he may have to use it.

"I'd be plenty busy if I had to bail out at 30-odd thousand feet," said MacCready. "That's why I'd like the parachute part of it to be automatic. So I decided to jump for experience."

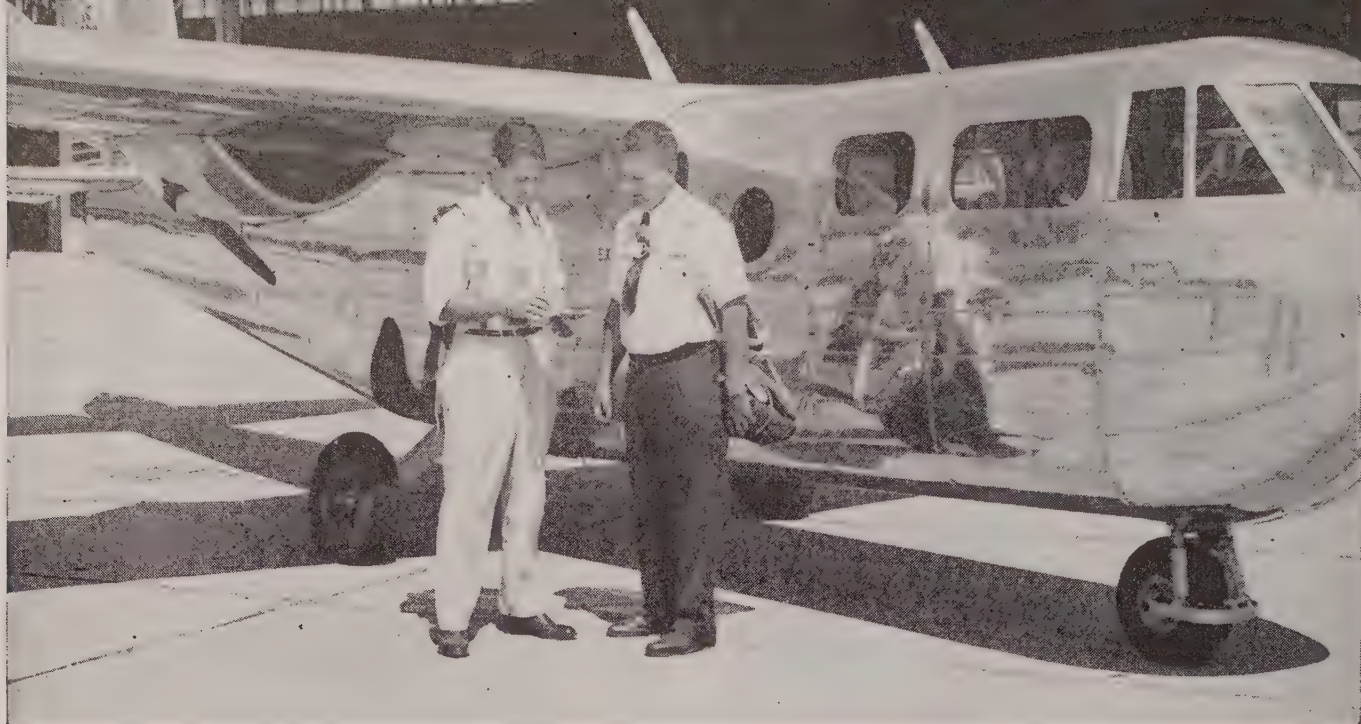
MacCready had Bill Bushman, a former paratrooper, to instruct him. The pair went up in a *Cub Cruiser* and MacCready bailed-out from something over 2,500 feet. The soaring champ landed easily in a plowed field.

Now that his first jump is under his belt, MacCready is ready to go after the records.

He is a graduate student at Cal Tech, working for his Doctor's degree in aeronautics. His home town is New Haven, Conn. 

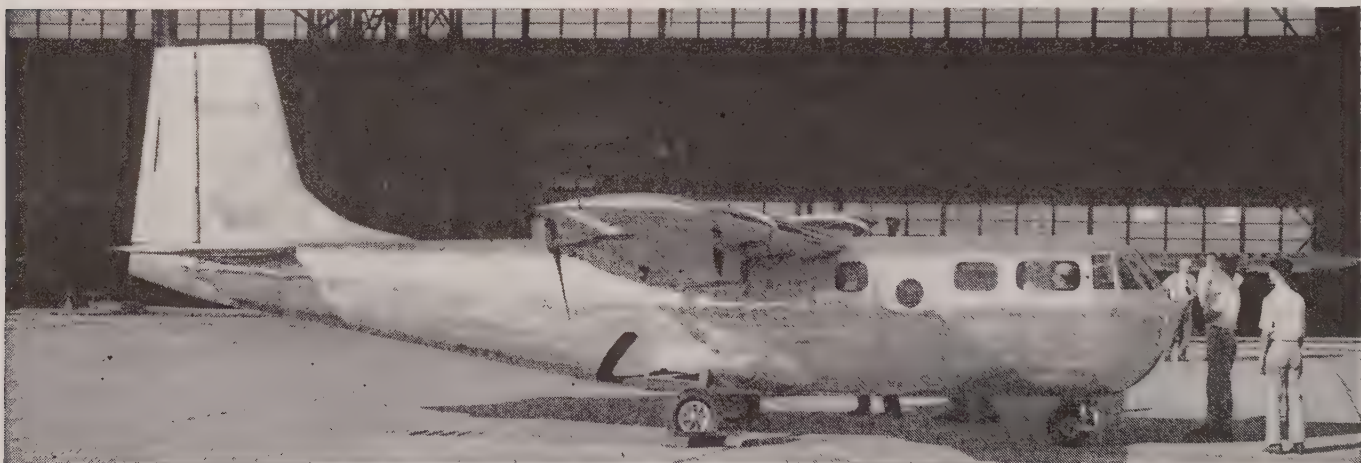


FIRST JUMPER'S chute opened at 2,500 feet over Puente. Cameraman Downie caught this unusual shot from another ship. MacCready landed easily. Purpose was to get ready for altitude attempt in a sailplane next spring



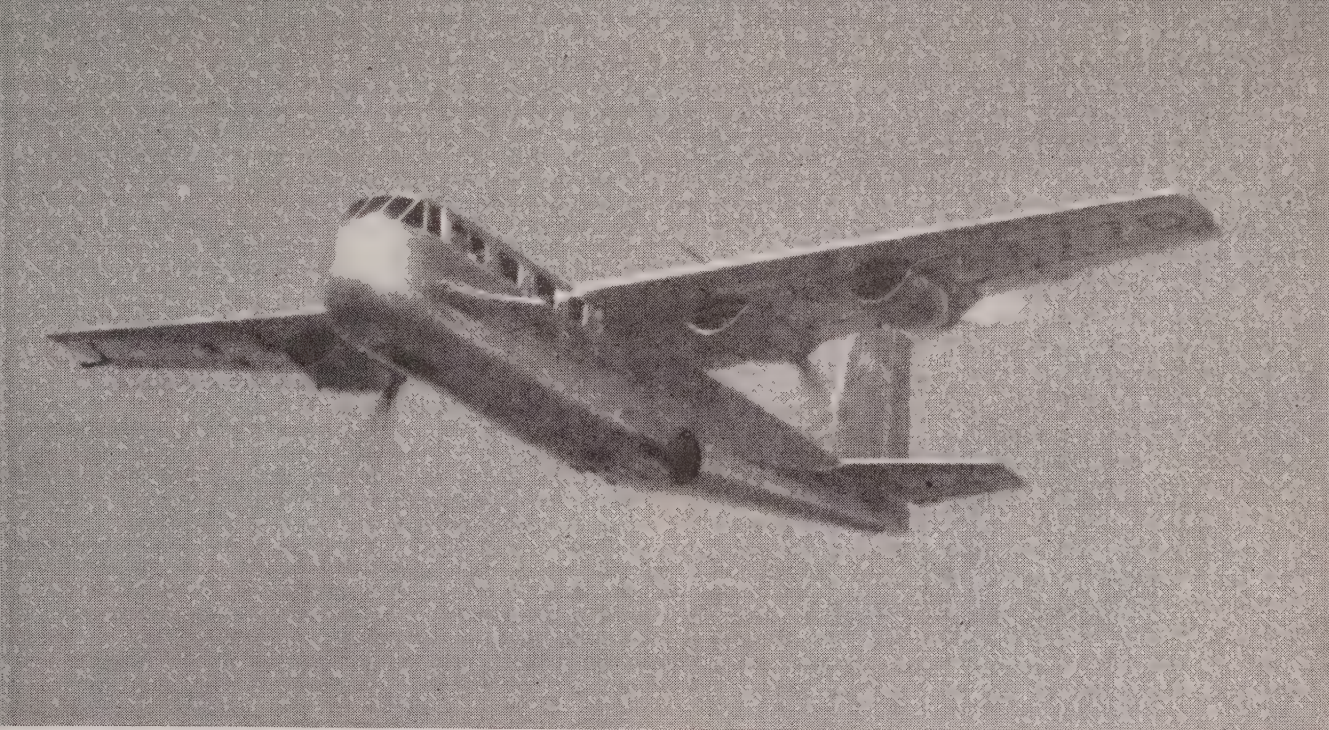
PILOTS Vincent (above right) and Monsted check data before taking the Starflight up for its first test flight

EXECUTIVE Starflight, powered by four pusher engines, is a junior-size airliner with range of eight hours



WING SPAN of the ship is 48 feet, and ship is 34 feet long from nose to tail. Gasoline tanks hold 172 gallons





FIRST FLIGHTS in the Starflight, according to both Vincent and Monsted, proved their ship to be better than planned

Airliner... Jr. Size

By **DON ANDREWS**

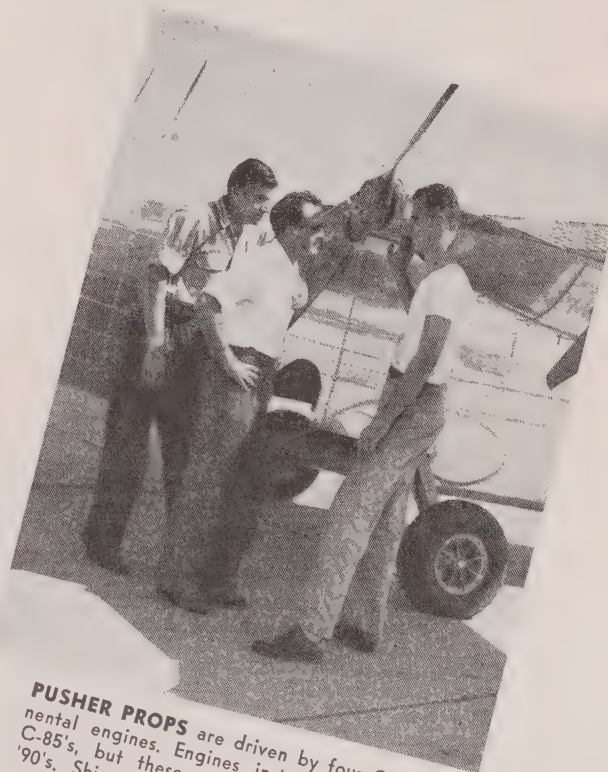
A FEW YEARS AGO, just prior to World War II in fact, a young man sat at the controls of a twin-engine airplane bound for the West Coast. The ship's "cargo" was a business executive, his three assistants, and numerous briefcases filled with papers important to what later became a vital war effort.

In the words of seasoned air travelers, the trip was uneventful. Uneventful, that is, if you want to discount bad weather. It was during a two-hour stint of weather, with the plane flying over rugged mountainous terrain, that the executive pilot began to consider the possibility of emergency procedure. The thoughts were not pleasant. Fortunately, however, the ship had been perfectly maintained, its two engines purred unfalteringly, the pilot knew his business, and the instruments on the panel provided all the information necessary to the completion of the flight. The VIP's were delivered to the West Coast destination . . . and according to ETA, too.

But the pilot of that plane didn't let his thinking stop there.

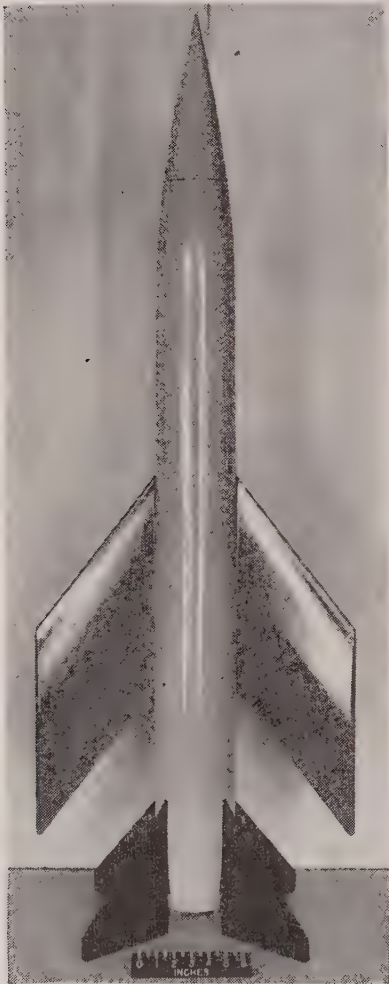
If two engines pro-

(Continued on page 45)



PUSHER PROPS are driven by four Continental engines. Engines installed here are C-85's, but these are to be replaced by '90's. Ship flies well on just two engines

Sonic-speed **MIDGETS**

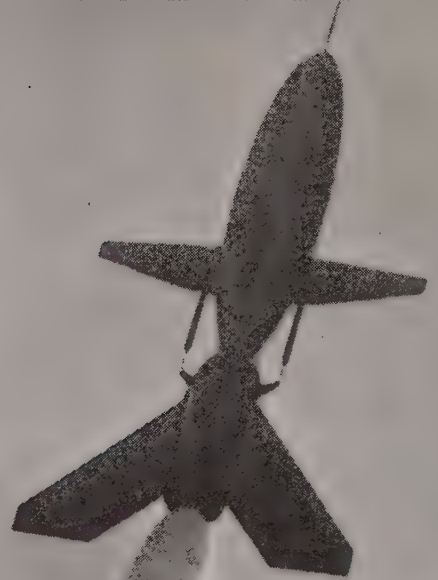


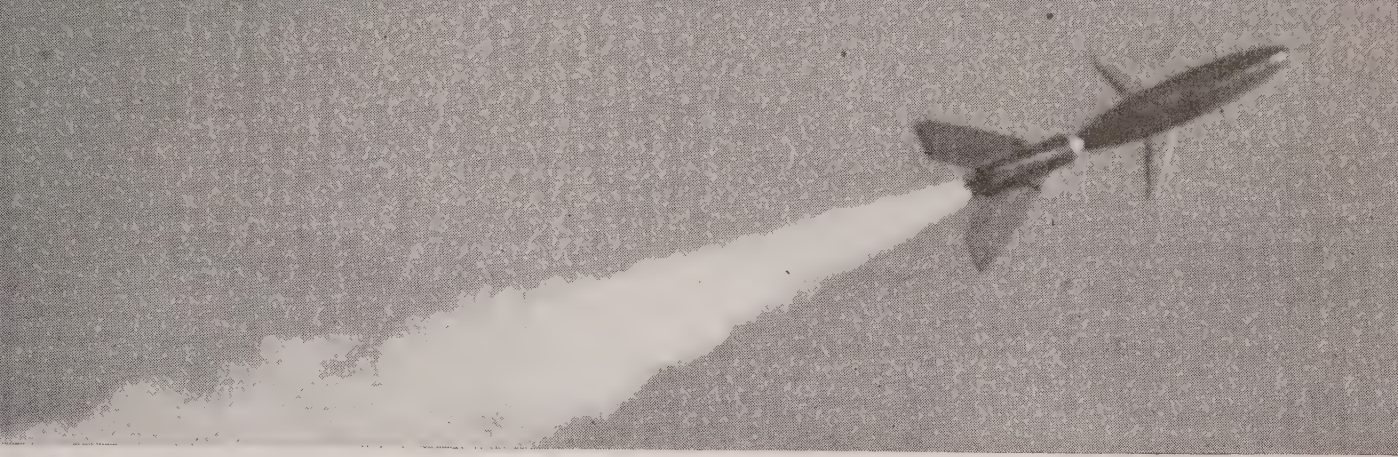
MODEL shown here is the NACA's low aspect ratio supersonic drag model

By **J. H. LEMELSON**

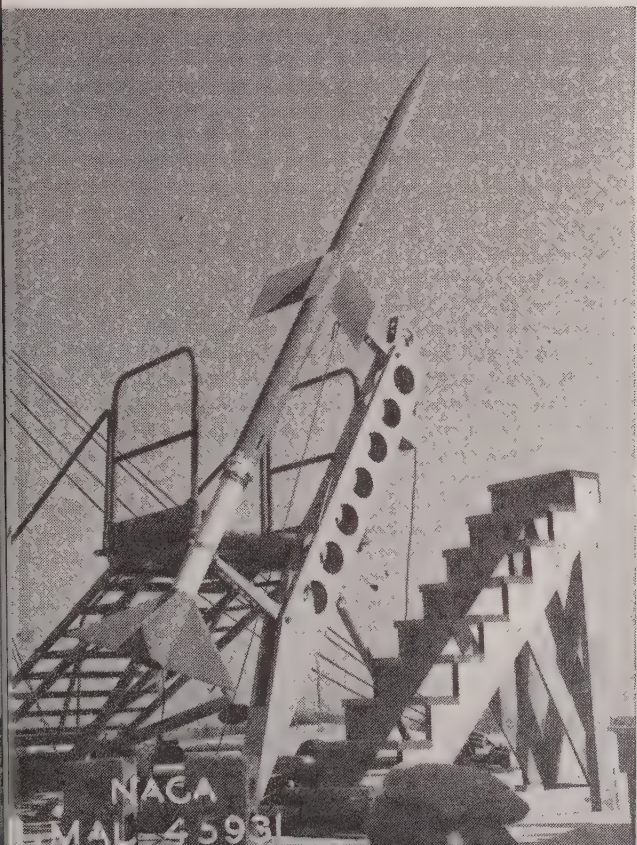
AERONAUTICAL engineers have put wings on the wind tunnel. Small models of tomorrow's rockets, jet engines and jet-propelled aircraft are tested today in actual flight by the National Advisory Committee for Aeronautics in conjunction with the USAF and

TEST MISSILE, shown here in flight (right), is used to measure such variables as speed, drag, yaw, etc., in flight





INFORMATION obtained from testing such models as this sweptback wing version of four-wing MX-570 Tiamat missile (above) or the test missile being fastened to B-29 rack (left) is telemetered to the ground where the readings are recorded



private industry. It's the "new look" in testing techniques—and a successful "new look" too.

Actually, there are several "new looks" involved in model flight testing, the purpose of which is to obtain information on engine operation at various supersonic speeds and to test the wings and fuselage configurations of tomorrow's aircraft in flight. Briefly, the present methods may be broken down into the following categories: (1) The model is mounted on the wings of a high-speed airplane and tested while the craft zips along at various speeds and altitudes; (2) The model itself is dropped from a high-flying airplane. As it descends, its speed and trajectory are plotted from the ground. Additional information such as temperatures, pressures, etc., are recorded by instruments within the model and radioed to the ground where it is picked up by the testing station's receiving apparatus. This system, widely used to advantage in many fields of science, is technically termed "telemetry"; (3) The model is mounted at some point on a rocket which is fired aloft at supersonic speeds. Here again, the results are telemetered. All three of the above techniques offer certain advantages over existing laboratory wind tunnels, though the degree of accuracy of the results obtained by them at present does not quite compare with that of the latter.

Many of the flight conditions which are produced in the laboratory wind tunnels by controlling temperature, pressure and air speed cannot be varied as rapidly as in actual flight, hence model flight testing is necessary for more varied results. Testing large scale aircraft and engines in flight is an old story to aeronautical

STUDY of the drag of various wing shapes is made via supersonic speed tests of such missiles as this RM-1



PILOT at controls of this flying test-stand Mustang is able to control the ramjets mounted on wings from inside cockpit

PULSE JET units, slung under wings of a Mustang, are tested as power boosts in flight and as jet assist in take-off



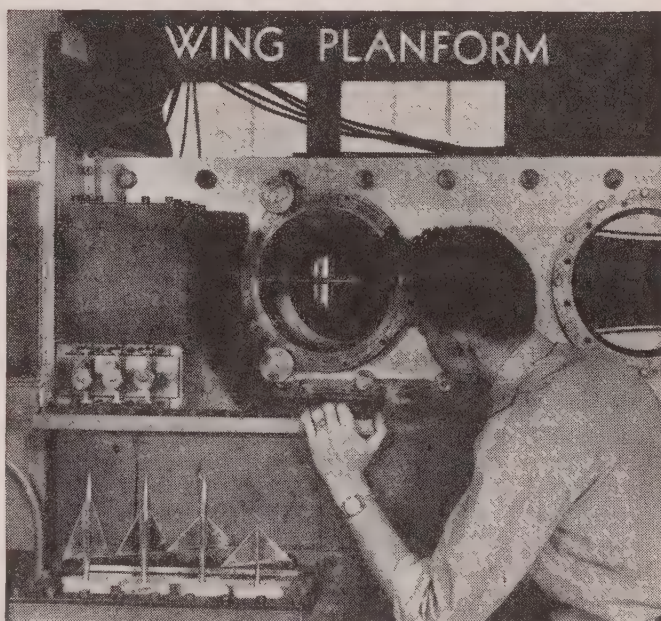


NACA TECHNICIAN adjusts mechanism for recording information obtained by testing models in actual flight on wing

engineers which dates back to man's first successful flights. Most often it was his only way of knowing how the airplane would perform. As aviation progressed, airplane manufacture was preceded by the design and construction of a model which was "ground flown" in a wind tunnel to determine approximately what forces would act on the full-scale plane in steady flight. With the aid of these approximations, the man-carrying craft was constructed and, more often than not, many bugs remained to be ironed out in flight.

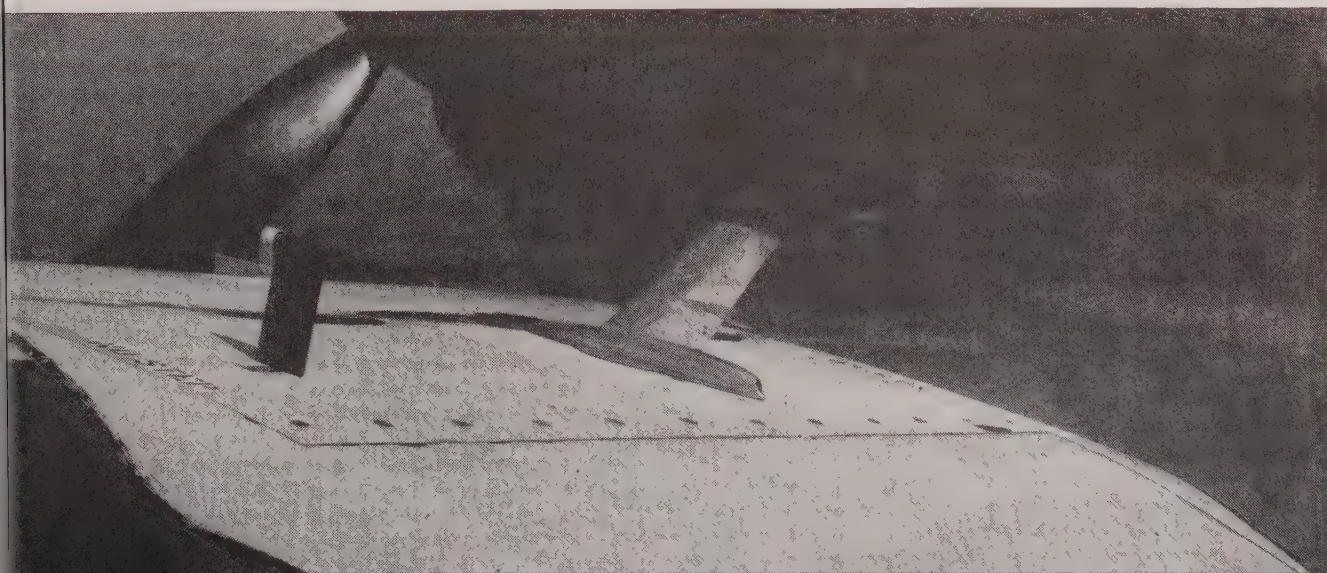
Engineers today, by combining the wind tunnel with flight testing, hope to be able to get a clearer picture of what will happen to their "baby" when it takes to the air.

Another flight testing method of which little information is available at present, involves propelling the model itself through space at a high velocity with an initial compressed air or powder charge. In this case, the model is completely destroyed when (*Continued on page 60*)

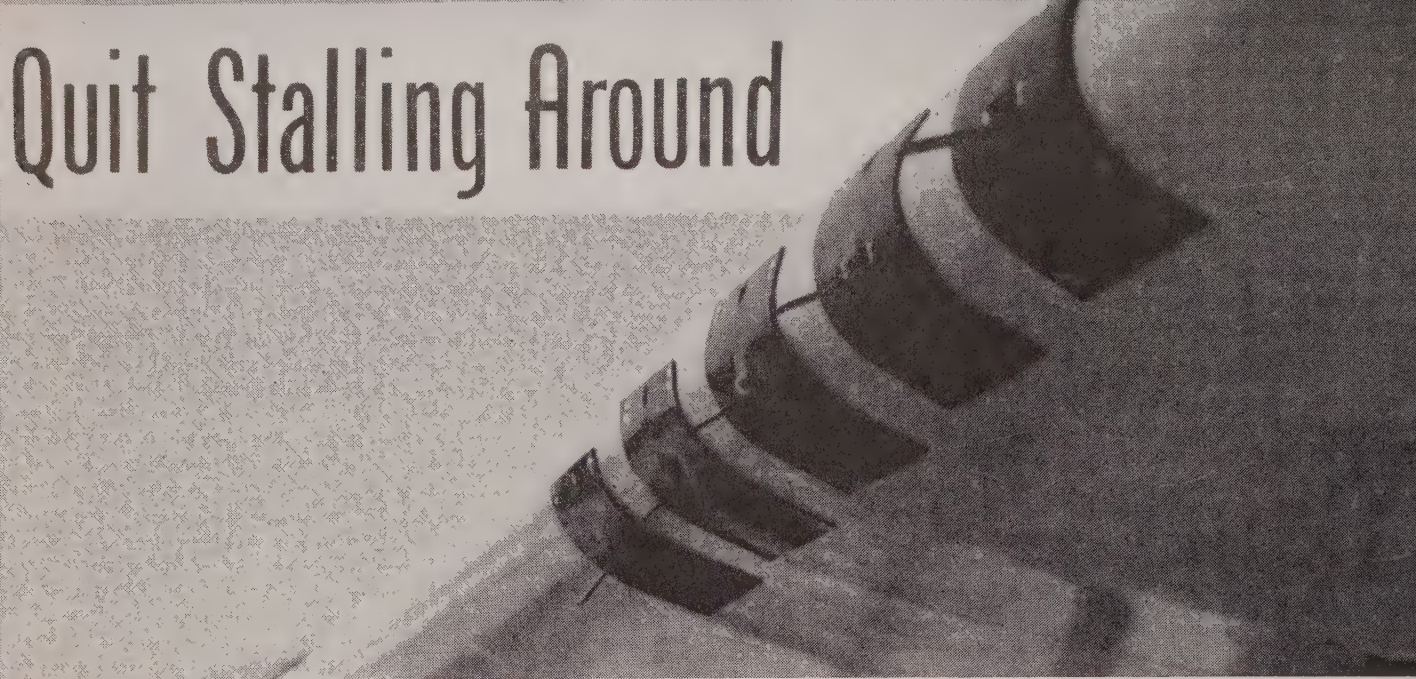


MODEL mounted in a nine-inch supersonic wind tunnel at lab is studied at speed up to 2.5 times that of sound

CLOSE-UP PHOTO shows a semispan model of a tailless airplane mounted for flight tests on the wing of a Mustang



Quit Stalling Around



STALL WARNING INDICATORS, five in all, were mounted on the left wing of the test plane for stall recognition tests

Test proves the seat of pilot's pants not sensitive to an approaching stall

By **CHET DUNN**

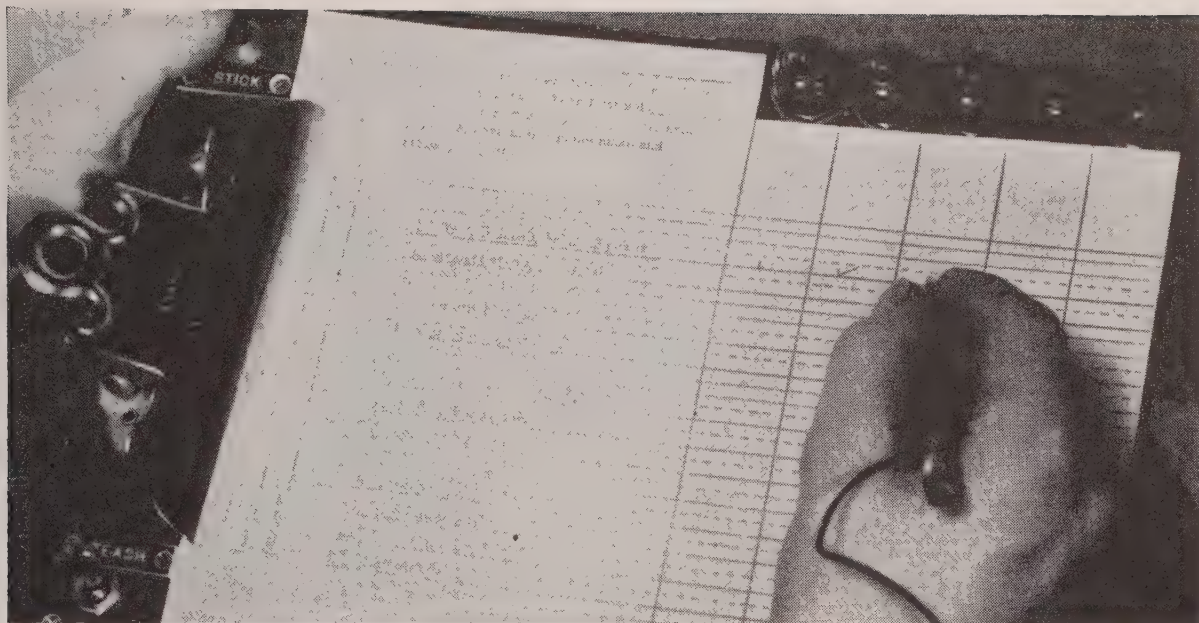
HOW sensitive is the seat of *your* pants? Are you proud of your ability to fly by reacting to your physical sensations during maneuvers? If so, beware, says the Civil Aeronautics Authority, particularly when it comes to sensing an approaching stall by the posterior method.

Flying by "feel" involves using the three physical senses of hearing, feeling and seeing. Linked with these senses must be flight experience recent enough to be of value and the proper judgment to make use of what your senses tell you. Every pilot knows that when an airplane stalls it is going to lose altitude. The important thing, however, is to be able to recognize an approach to a stall and to correct the condition before the airplane's flight path intersects the ground at some unexpected and embarrassing moment.

The CAA has recently financed flight tests at three eastern commercial airports in order to

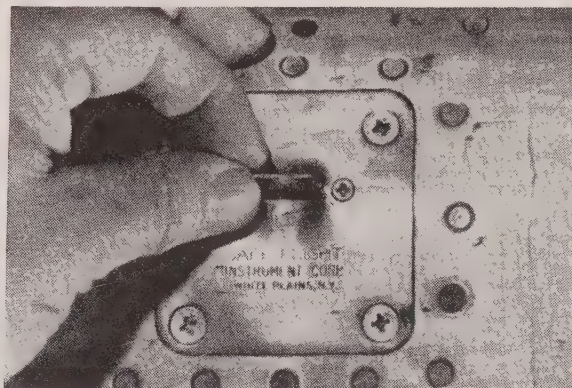
WARNING LIGHT and horn unit of stall warning indicator is shown at far left of top row of the Stinson panel





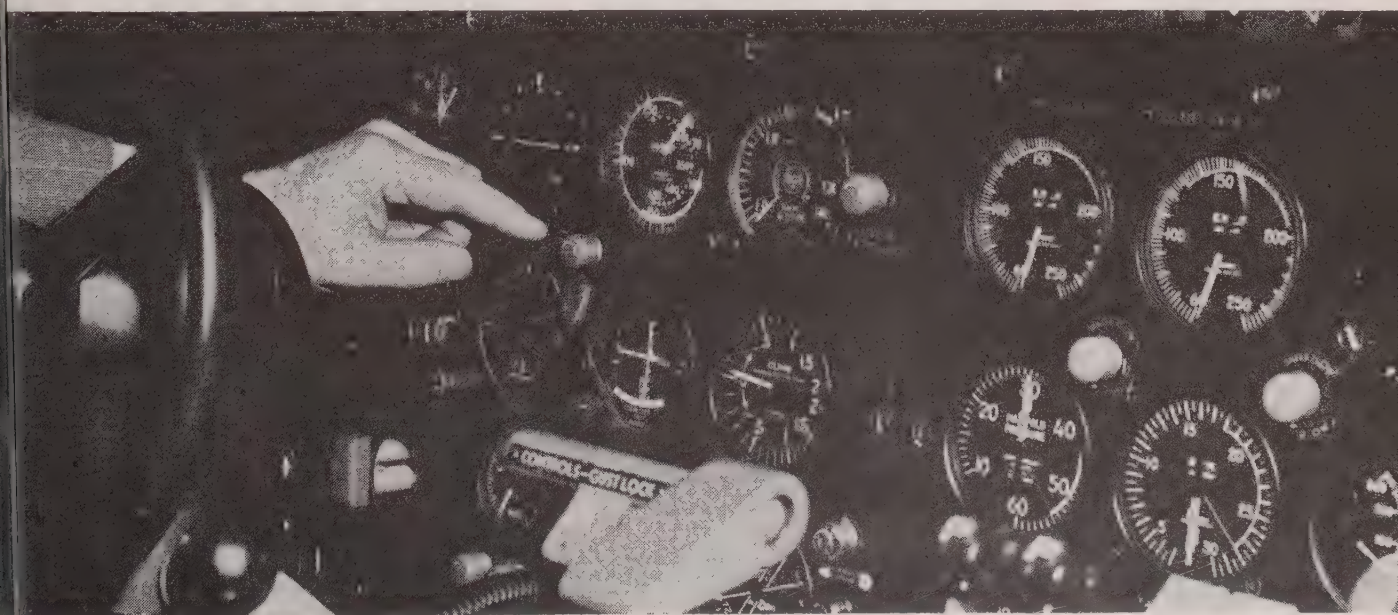
CHECK PILOT kept a chart showing results of tests. Note five lights atop board. These flashed when stall was near

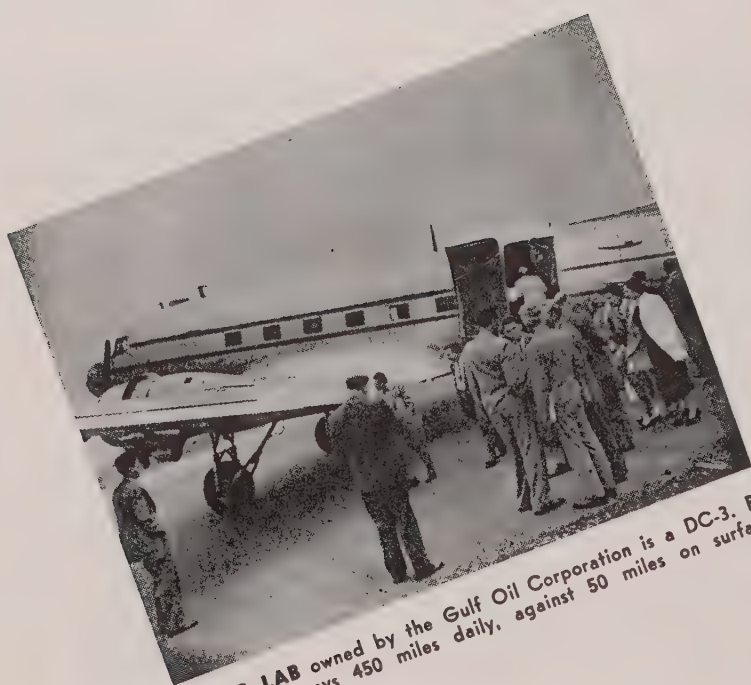
determine whether the "seat of the pants" is sensitive enough to detect an approaching stall with sufficient reliability. The results, bearing out accident statistics, indicate a definite answer of no. There is no question of recognizing the stall after it has arrived. But the tests proved that the typical pilot cannot identify the edge of a stall when he consciously tried to fly the plane up to that point but not actually into the stall. Another and perhaps more surprising result of the tests showed that the pilots who were tested frequently approached stalls when told to stay in normal flight. Two series of stall recognition tests were (Continued on page 49)



STALL WARNING device shown here is exterior part of the unit installed on a Convair-Liner

INTERIOR LIGHT which warns of approaching stall is pointed out here by pilot. This one is on panel of Convair-Liner

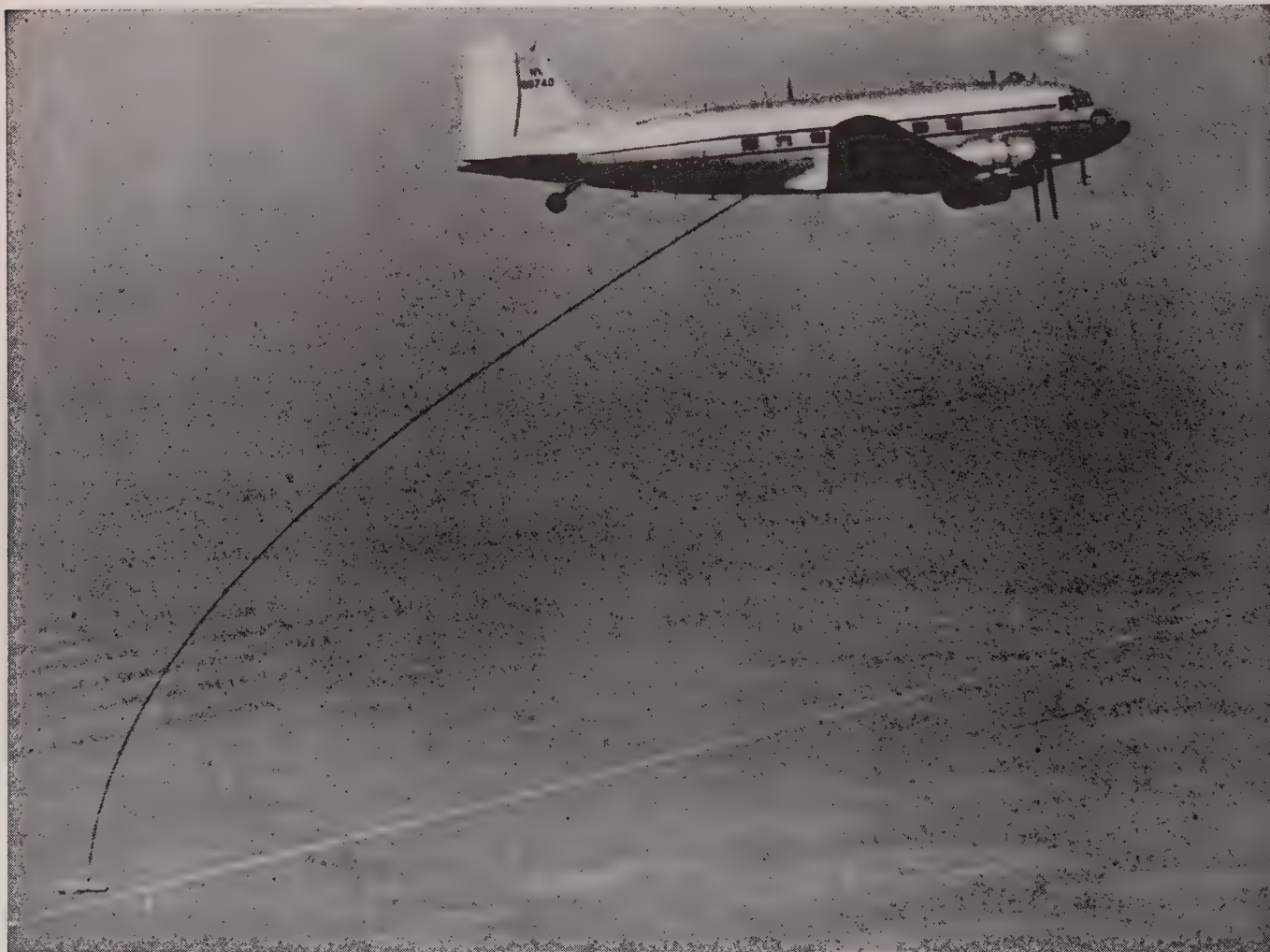


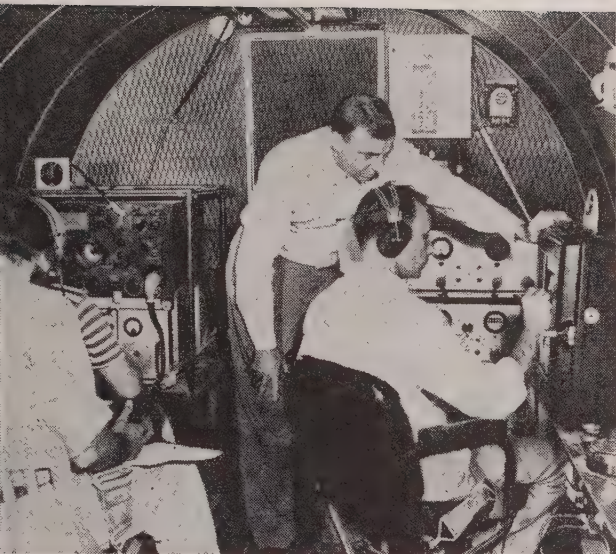


FLYING LAB owned by the Gulf Oil Corporation is a DC-3. By air, Gulf surveys 450 miles daily, against 50 miles on surface

HOIST in the plane lowers magnetometer from a cradle in cabin of DC-3, and pulls it back

MAGNETOMETER is trailed beneath the plane flying at an altitude of 1,500 feet and at 150 mph, measuring magnetic strength of the earth





CREW on board the flying lab keeps track of readings transmitted by the magnetometer as it trails below them




LABORATORY at Gulf's ground station is where mathematical calculations are made before the maps are prepared

Air Search For Oil

THERE is probably nothing more constant nor as continuous as the search for oil. Every year, millions of dollars are spent in the quest for the black gold that heats our homes, fires our factories and fuels the forces that defend our shores. To aid in keeping us ever supplied, the Gulf Oil Corporation has developed a unique device to help in locating oil reserve areas.

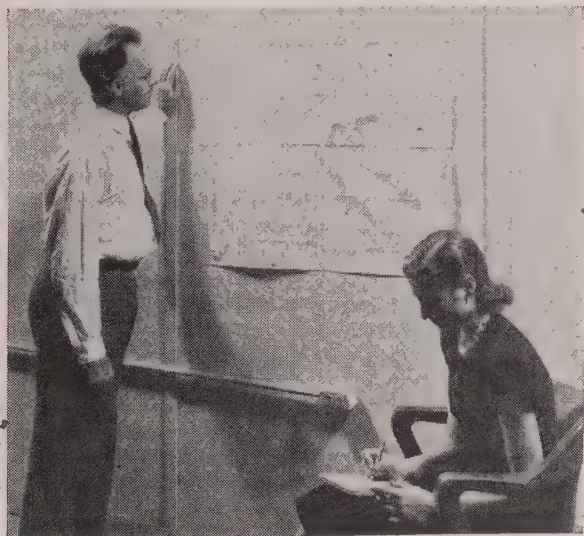
Called a flying magnetometer, this device is trailed beneath Gulf's flying laboratory as it flies about 1,500 feet above the earth and at a

speed of 150 mph. This device measures the magnetic strength of the earth over which it passes. From this data obtained by the "bird," as it is called, geophysicists can prepare contour maps to show formations of rock beneath the surface of the earth. In turn, these maps enable the geophysicists to select the most geologically promising areas for a further exploration for oil.

Feature of the flying magnetometer is that it permits magnetic mapping of heretofore inaccessible areas such as jungles, oceans, etc. 

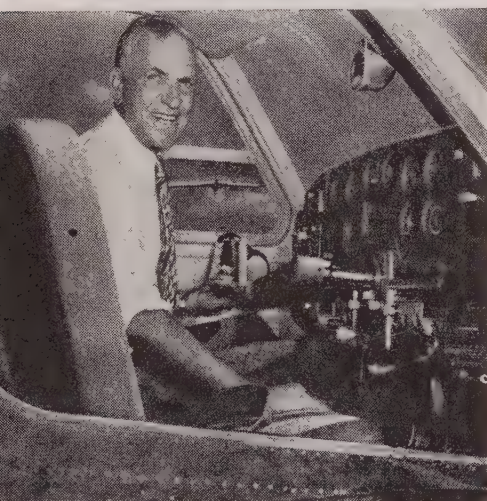
SURVEY completed, the geophysicist studies the map to locate possible oil areas. He dictates his findings

MAGNETIC readings are plotted on map. Shoran dials on plane are photographed every 20 seconds for accuracy





NAVION-OWNER Brian Donlevy commutes between California and the East in his ship, purchased when North American built Navions



PIONEER flyer is Director Henry King who uses his Beech Bonanza to scout out locations for the motion pictures he directs



SINGER Dick Haymes used this Seabee for a fishing trip, but his own airplane is a Navion. Haymes is shown here with Mr. Jon Hall



RADIO STAR Arthur Godfrey owns and operates a Navion. Since his first flight in 1920, he has logged 2,500 hours

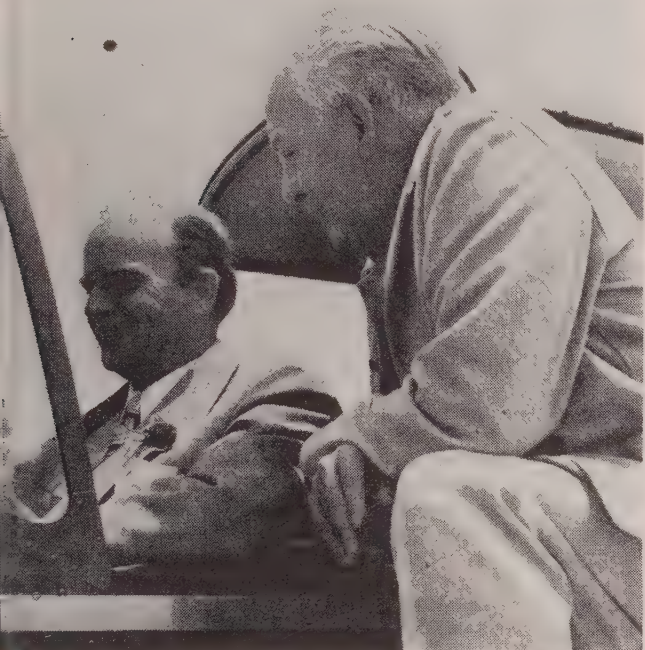
By FAVIUS FRIEDMAN

Stars of stage, screen, radio find aviation an aid in their business

HOLLYWOOD film stars are taking to the sky like thousands of other private pilots throughout the country. Not only do they love flying for its own sake, but they're also finding their lightplanes invaluable in the exciting and demanding business of making motion pictures.

Scores of actors whose faces, to millions of movie-goers, are as familiar as household words, are seen every day on the various airports of Southern California. They can be found in a huddle with their mechanics talking the language of mechanics. They can be found with the weather observers, plotting flights. And they

STARS



AIRPORT OWNER as well as a flyer, Edgar Bergen recently bought a new Navion to add to his growing fleet of planes

can be found, too, at the snack bars sipping coffee and gesticulating with their hands over some particular maneuver—hangar flying with the guy on the next stool.

Their names may be in lights on theatre marquees, but at the airport they're just plain pilots—private pilots who are serious about flying. Some even have successfully gone into the aviation business themselves as a thriving sideline.

Dick Powell, Brian Aherne, Robert Taylor, Andy Devine, Tyrone Power, Edgar Bergen and a host of others have been air-minded for a decade or longer. Many starting as teen-agers, like Robert Cummings, have been flying for as long as 20 years.

Today the long and growing list of Film-town's flying enthusiasts includes the stars already mentioned, plus veteran flyers like Jose Iturbi, directors Henry King and Clarence Brown, radio-ite Arthur Godfrey, who has logged more than 2,500 hours since his first flight as a

NAVY PILOT during the war, Actor Wayne Morris owns a Seabee but he flies a Grumman F6F as a Lt. Comdr. in the Naval Reserves



FLYING TEAM, well known both in and on the air, is the Frances Langford and Jon Hall combine. Flying is a business, too, to the Halls



ACTOR Tyrone Power owns a twin-Beech and a DC-3. He and a crew of five flew the DC-3 to South Africa. During war, Power was Marine



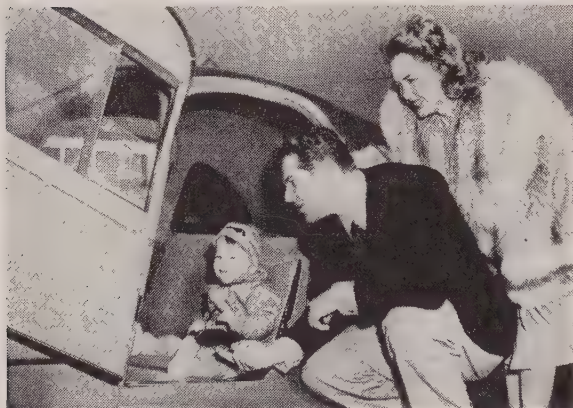
17-year-old apprentice seaman, actors James Stewart, Bill Goodwin, Lee J. Cobb, Wayne Morris, John Payne and Jon Hall, while among the newest pilots are Mickey Rooney, Robert Young, Frank Sinatra, Dick Haymes, Rod Cameron, Rory Calhoun, Walter Slezak, and Brian Donlevy who commutes between Hollywood and the East in his *Navion*.

Jimmy Stewart has been flying since 1935 and has logged over 2000 hours, a great deal of that time in B-24's. Like John Payne, Stewart was a model-plane enthusiast when he was eight or nine, and since he was still too young to fly, took up model-plane building so that he could earn enough money to pay for flying lessons that would come along later. Oddly enough, one of the reasons Stewart went into pictures was because he figured it might be quickest and easiest way to make enough money for a plane of his own. He got one eventually—a Stinson.

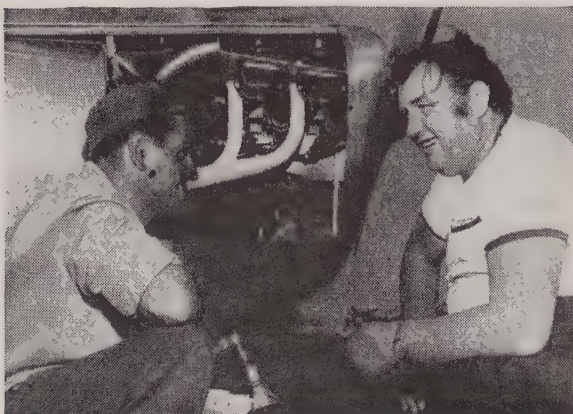
The variety of planes the Hollywood pilots own is almost as diversified as their multitude of screen characterizations. Robert Young and Mickey Rooney fly Ercoupes, Arthur Godfrey owns a *Navion*, while Sinatra logs his air time in a new Beech *Bonanza*. These are just a few of



MOVIE STAR Robert Taylor was Naval Air instructor during war. Out of service he bought a twin-Beech



VETERAN PILOT and actor Robert Cummings took his son up for his first flight on his first birthday. Mrs. Cummings stayed on the ground. Another flying movie star is Andy Devine (below) who operates flying school



the different types of planes the screen stars fly. And they really use their planes, too.

Robert Taylor, who learned to fly in a two-place trainer at Long Beach, California, back in 1936, uses his twin-engine Beechcraft for just about anything you can think of—cross-country trips, location hops, vacationing and hunting. Not long ago Taylor set some sort of record on a hunting trip—he left Hollywood on Friday night, after a day before the cameras, and returned the following Monday morning in time for an 8 a.m. call. That weekend Taylor and his companions shot pheasants in South Dakota, deer in Texas and duck in Northern California. And when the fish are biting, Taylor and his Beechcraft are right on hand, no matter where the fish may be.

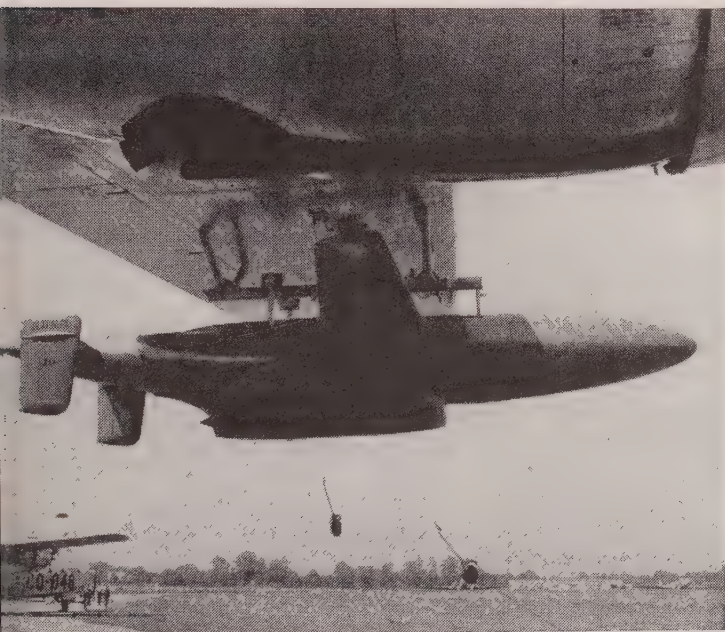
Going on location is a simple thing when you're flying your own plane, as both Dick Powell and Lee Cobb have discovered. Cobb, one of Hollywood's noted character actors—you've seen him in "Boomerang" and in "Johnny O'Clock"—was needed in Chicago for additional scenes in Twentieth Century Fox's "Northside 777." One hour's notice was all that Cobb got, but it was enough. He flew his *Bonanza* to Chicago, making two stops along the way, did a two-day acting stint and then flew back home again. All it cost him was \$80 for oil and gas. When the same studio's "Captain (Continued on page 52)



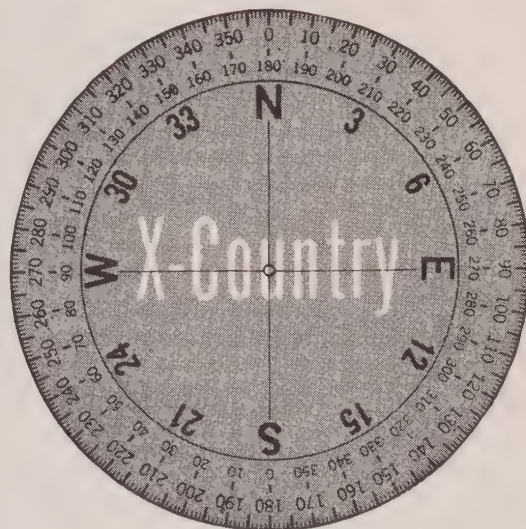
TINY MITE, called the "smallest sailplane in the country," is an amateur-designed Johnson-Parker. In addition to its being the smallest, the "Tiny Mite" is said to be the only one equipped with flaps. The flaps are Fowler type and are designed into the contour of the wing, extending 30 degrees in full position. The ship cruises at 100 mph



PETULANT PORPOISE is the unofficial designation of this Edo-modified Widgeon. It is now undergoing extensive water and flight tests by the Navy as part of a research program to increase the hydrodynamic and aerodynamic efficiency of large flying boats. Scaled-down reproductions of large hulls will be tested on this Widgeon



KDN-1 is the Navy's radio-controlled anti-shiping guided missile. It is shown here in firing position under the wing of Navy PB4Y-1. The missile is powered by a diminutive Westinghouse jet unit mounted underneath



USAF's only Skymaster fitted with reversible props demonstrates JATO take-off. Crew of this plane (C-54 G-I-DO) last year rescued the crew of a crashed plane in Greenland by landing a C-54 on ice, using JATO to get off





Don't forget . . . an idling jet really laps it up!

DILBERT

By Seth Warner and Robert C. Osborn

How to Regain Fuel Suction

—Recent information indicates that many pilots are hazy about the best method for regaining fuel suction. There is nothing mysterious about it, as shown by the step-by-step procedure listed below. It should be understood and memorized.

Note: The first three steps

are usually sufficient for partial loss of suction, but not if *complete* engine cut-out occurs.

1. Shift to proper tank, making positive visual check of selector valve position. Reason: You can't get gas from an empty tank.

2. Switch on auxiliary fuel pump, or use hand wobble pump. Reason: To give maximum assistance to fuel flow, and to prevent vapor lock at engine-driven fuel pump.

3. Retard throttle to starting position. Reason: An engine doesn't like to start at full throttle in flight any more than on the ground.

4. Place mixture control in *Idle Cut-Off* until adequate fuel pressure is built up, then return



to *Auto Lean* or *Auto Rich*. Reason: To prevent premature starts and minimize backfires.

5. Nose over into steep glide. Reason: To provide maximum gravity flow of fuel to auxiliary pump, and to provide adequate rpm for engine pump.

6. Use primer, if necessary. Reason: Fuel discharge from carburetor alone may be inadequate until it is completely filled and normal pressure restored.

Give yourself an occasional mental emergency drill in this procedure during flight, to insure speed and accuracy. Remember, if you run a tank dry at low altitude—below 3,000 feet—there probably will be insufficient time to regain suction. Therefore, *Never run a tank dry at low altitude!*

Daredevils Front and Center—Are you a *safe* pilot; one who fully appreciates the inherent hazards of flying and (Continued on page 55)



CAOA REPORT . . .

CORPORATION AIRCRAFT OWNERS ASSOCIATION, INC.

Corporation Aircraft Owners Association is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminatory legislation by Federal, State or Municipal agencies, to enable corporation aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. The CAO headquarters are located at 444 Madison Avenue, New York 22, N. Y.

CAOA Membership . . .

Several new members have been welcomed into CAO ranks. Among them are: The Robert Dollar Company, of San Francisco; Bethlehem Steel Company, of Bethlehem, Pennsylvania; Standard Oil Company of Ohio; S & W Cafeterias, of Charlotte, N. C.; Universal Moulded Products Corporation, of Philadelphia, Pa.; and the Rahr Malting Company, of Manitowoc, Wis.

The Bethlehem Steel Company operates a Lockheed Lodestar, as does the Robert Dollar Company, while both the Rahr Malting Company and Universal Moulded Products operate twin-Beechcrafts. S & W Cafeterias own a DC-3. All of the ships are flown under night as well as day conditions, and have full complement of instruments for instrument flying.

Business Flying

A recent CAA survey has confirmed what industry long has realized—that business is the biggest single incentive in the

use of personal aircraft. Of the licensed pilots queried, 86 per cent gave either business alone or a combination of business and pleasure as their purpose in flying. Only 25 per cent of the least active group of pilots reported they never flew for business.

Reflection Error

According to a report received from Canada's National Research Council, the presence of rain on the windshield causes a reflection error. The error may amount to as much as 5 degrees in angle, or about 1 in 12. As a result a hilltop or peak one mile ahead of a plane could seem to be about 200 feet lower than it really is. The reflection error is said to be the result of the shape and pattern of ripples formed by the rain and the reduced transparency of the windshield under rain conditions.

Pilots are reminded to keep their reflection error in mind when flying in rain and low visibility conditions.

Automatic GCA

The first flight demonstrations of Gillfillan's new automatic Ground Control Approach system were made recently. In the automatic version of GCA, incoming planes are tracked by search radar and then landed by radio control linked to the plane's auto-pilot.

News Notes

Piper Aircraft Corporation, Lock Haven, Pa., has taken over the manufacturing rights of the Stinson Voyager, and is expected to get into production very shortly.

The Baumann *Brigadier*, twin-engine personal executive plane, is now undergo-

ing its CAA tests. The company, Baumann Aviation, Inc., expects to get the five-placer into production soon.

The CAA is considering the establishment of a central pilot training school at which the CAA would train all U. S. civil and military transport pilots. Main purpose would be to provide a uniform standard of pilot efficiency. Location under consideration is American Airlines site at Ardmore, Okla.

Beech *Bonanzas* and Republic *Seabees* are being used as bombers by the Israeli Air Force. Equipped for tactical operations, the *Bonanza* carries two men armed with Sten guns, and a homemade bomb release that cuts loose 100-pound bombs carried externally under the wings. The *Seabee* is used without a door, and 100-pound bombs are tossed through an open hatch.

CAA reports that the slope line system (illustrated in January CAO News) is nearing approval and probably will be adopted as the new joint military-civil approach light standard. The slope line system consists of a double row of lighting units extending outward in a funnel for 3,000 feet from the end of the runway.

The units are installed at a 45-degree angle to the ground. When viewed on course, the slope line lights merge into a continuous line of lights pointing to the runway threshold.

CAA expects to draw up detailed production specifications for slope line systems and call for bids on quantities that can be purchased.

Winterizing

If you're getting ready for winter and want to protect that plane of yours, consider the case of ReGlo, a protective coating that is literally a "sprayed-on hangar." ReGlo was introduced to the aircraft industry last spring, and already has gained wide favor. The coating automatically gives metal and fabric surfaces a high-gloss hand-rubbed effect, and effectively seals all surfaces against weathering, corrosion, acids, etc. It's put out by Regal Air Corp.



EXECUTIVE ship belonging to the R. M. Hollingshead Corporation is a Douglas DC-3. It was recently used to fly men to the plant



MAESTRO Vaughn Monroe now owns a Lockheed Lodestar which he bought to transport his orchestra to points on tour

PLANE FAX



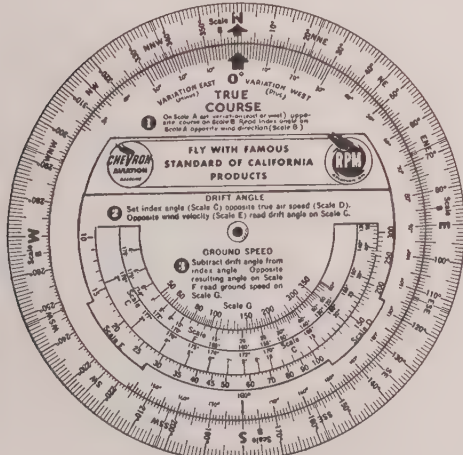
Take a tip from the Queen of the Sky

es, it's the Boeing Stratocruiser. Cruising at 340 mph (14,000 hp) and carrying 80 passengers, this marvel of aerodynamic design proved itself in many months of rigorous testing. In recent CAA Proof and Reliability Testing of the Boeing Stratocruiser, covering

over 200 hours of flying under a wide variety of conditions, RPM Aviation Oil was used exclusively! So to get the best aviation oil for *your* plane, follow the lead of the great Boeing Airplane Company which selected RPM Aviation Oil for use in their *entire commercial production!*

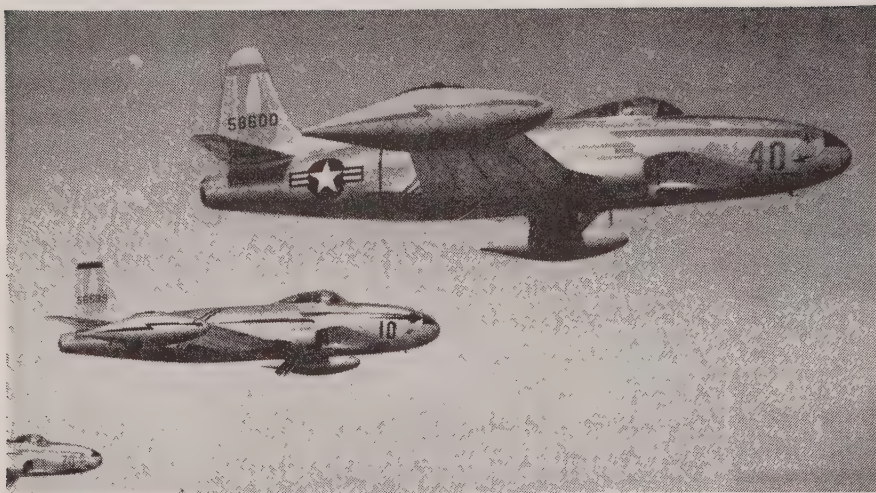
Do you have your free flight calculator?

You can figure your speed and distance with this handy little flight calculator



As an additional service, Standard Airport Dealers are offering flyers improved flight calculators. You'll find this accurate flying aid helpful in checking speed and distance traveled with allowances for temperature and altitude. Drop in to your Standard Airport Dealer for your calculator, soon. There's no charge, of course. And while you're there, ask about the "Ten point plan" by which Standard insures top ground service for your plane.





JET FIGHTERS require cockpit coolers. Plane flying at 700 mph at 35,000 feet, with outside temp of 25° below zero F, would have cockpit temp of 440° F without cooler system

Operational Engineering

Cockpit Coolers

CLIFF GARRETT states the problem this way: "An airplane flying at sea level at 700 mph has a net skin friction temperature rise of 75°F. The same airplane at sea level at 1,000 mph would have a 150° net temperature rise, and the same airplane under the same conditions at 1,500 mph would have a net skin temperature rise of 339°. An excellent example of the cockpit temperature created by this condition is the record speed flight (last year) of the Douglass *Skystreak*. At a sea-level condition, non-pressurized, at 656 mph, the cockpit temperature would have been 178° had there not been some form of refrigeration. If you are familiar with the meat thermometer used by housewife in roasting her beef, you'll find that 178° is labeled the "well-done" point.

"This is only one very simple problem. Now, let's take a hypothetical jet fighter. We all know that at over 15,000 feet planes must be pressurized for maximum pilot efficiency. At present the source of compressed air for pressurization is the extremely hot air which is bled off from the jet engine's compressors. Now let's take this hypothetical fighter and fly it 700 mph at 35,000 feet where the air temperature will be say, an average of 25° below zero F. Without refrigeration of any sort you would have a cockpit temperature of over 440° F. At the same altitude and at speeds of 1,000 mph, this figure would rise to approximately 530°F., and at 1,500 mph you have a cockpit temperature of approximately 750°F."

It all makes for a compact pressurized

human cooker, according to Garrett, so the airframe manufacturers turn to an accessory manufacturer like The Garrett Corporation's AiResearch Manufacturing Company for a solution to the problem.

In effect, the accessory designers are told: we want some air cooled in an airplane, but you haven't much room and the system you use must weigh practically nothing and we want no makeshift like putting a couple of blocks of ice behind the pilot.

The equipment engineers (who do not like to be called aviation plumbers) had to find the solution before high-speed jet flight could become common property. The correctness of AiResearch's answer is pointed up by three pertinent, related groups of facts, in order: 1) The basic refrigeration unit used in the F-80 and practically every other U. S. jet, consisting of an expansion turbine coupled with a heat exchanger, weighs only 16½ pounds complete. 2) When the Douglas *Skystreak* set a world speed record last year over the California desert, the cabin temperature was kept at approximately 90°F. despite an outside air temperature of 100°, an airplane skin temperature of approximately 165° and jet bleed air temperature of 400°. And 3) in this line of statistics, the AiResearch turbine refrigeration units are currently standard equipment in 99 per cent of the jet planes now flying or under construction in this country. They've built a good mousetrap.

Here's how the engineers went about solving the cooling job problem which is

comparable in temperature requirement to the efforts of 40 household-sized refrigerators. The previous mention of putting ice in the cockpit is not farfetched since this desperate expedient was resorted to in some wartime piston-engine planes, but 5½ pounds would melt during every minute of high-speed jet flight, giving another idea of the heat involved. The vapor-cycle system of the ordinary refrigerator and air conditioner comes next to mind, but it is barred by reason of weight and bulk. Because of the latter considerations, combined with the presence of a source of compressed air from the gas turbines, the air-cycle system, in which expanding air passes through turbine-heat exchanger units, comes to the fore in the jets.

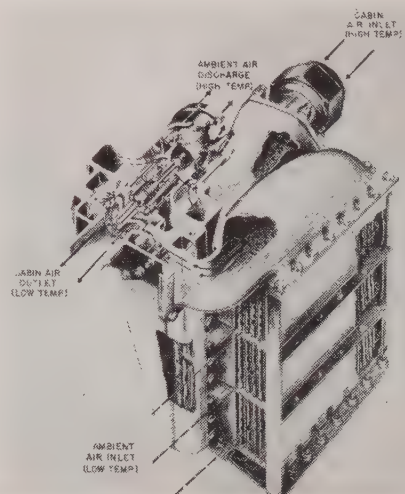
Briefly, there are five types of air cycle set-ups that have been considered at one time or another, all utilizing these same basic elements: expansion turbines, heat exchangers, aerodynamic axial or centrifugal compressors, and axial or centrifugal fans. The systems are the "simple," bootstrap, regenerative, reduced ambient and shoestring. The differences are primarily in the source of compressed air used and in the manner the four typical elements are compounded. AiResearch uses the "simple" system in all its present fighter installations for 600 mph speeds.

In the typical refrigeration system shown in the accompanying diagram, as used in the Lockheed F-80 and the Douglas *Skystreak* and *Skystreak*, air bled from the gas-turbine compressor enters the cooler through the cabin air inlet and passes down through the tubes in one section of the assembly. The cooler is divided by baffles into two equal sections, each section having a total of 242 aluminum tubes running vertically. The pressurized air then reverses direction to flow up through the tubes in the other section and into the duct passage mounted on top of the assembly.

While this is taking place, cooling air from the atmosphere enters the heat exchanger through the ambient air intake and flows around the tubes in the ambient air intake section, reversing direction to flow around the tubes in the other section and

(Continued on page 53)

CUTAWAY SKETCH is of Airesearch refrigeration unit used in the Lockheed Shooting Star



Airliner, Jr. Size

(Continued from page 27)

vide more flight assurance than one, reasoned Pilot H. Farley Vincent, then four engines would provide at least twice that assurance. From just such a practical bit of reasoning eventually envolved the *Star-flight*, a four-engine executive ship designed to meet the all-weather needs of the businessman flyer.

In January, 1946, a group of ex-GI's, one of whom was Major Vincent, formed a corporation in New Orleans. Purpose of the corporation was the design and development of an executive airplane for today's air traveling businessman. Ideas were pooled, opinions aired, analyses made and finally, specifications laid down.

How aircraft designers and engineers arrive at decisions regarding plane specifications is illustrated in the development of this four-engined airplane.

First item under consideration was the ship's engines: The powerplant decided upon was the Continental C-85—four of them, each with fuel injection system. This would be a simpler installation, the group decided, than that of 360-hp in one package. The Continental C-85 (later to be replaced by the C-90) would give absolute freedom from carburetor icing, and would mean fewer controls—i.e. no mixture controls and no carburetor heat controls. There would be four throttles, four prop controls (two-position) and four switches, but to offset these, there'd be no need for manifold gauges, no head temperature gauges and no carburetor temperature gauges for a pilot to watch.

Range was the next consideration. In going over this problem, it was decided that "to look at weather with a chance of running for the clear," nothing less than eight hours of gasoline, at economical cruise, would be sufficient. So 43-gallons per engine was the requirement, with integral tanks installed in the outboard wing panels. Gasoline carried outboard of all engines would mean a better weight distribution, and with the weight of both the engines and fuel distributed along the entire span of the wing, a saving of weight in construction would be effected.

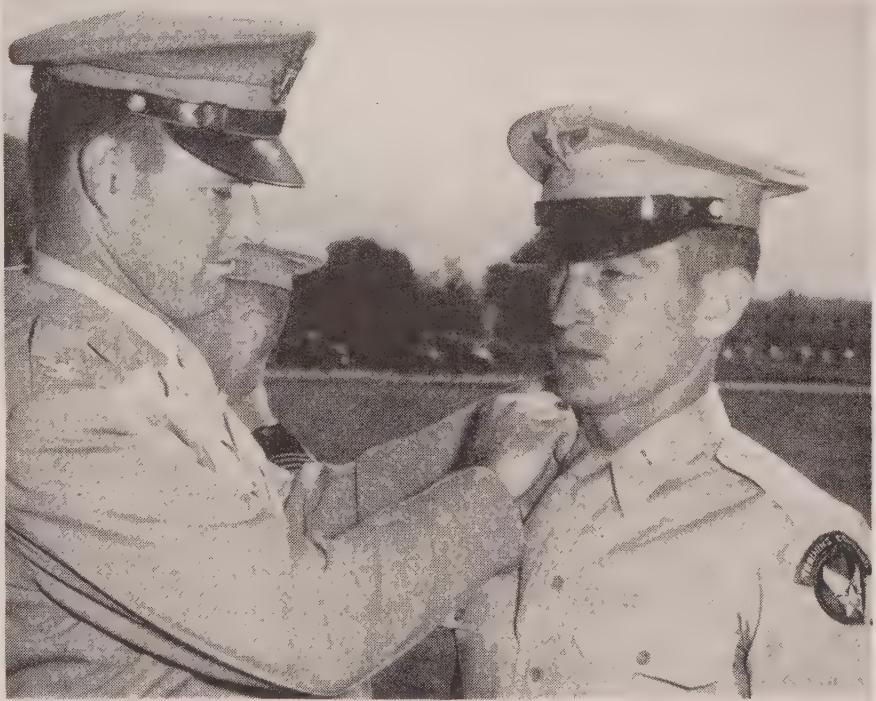
This matter of range, however, produced a secondary problem. Apropos of the old and true saying that the "range of an airplane is the distance between comfort stations," it became readily apparent to the designers that a small rest room would have to be built into the ship if the eight-hour range was to be an honest one. That's how a small and compact all-metal rest room was designed into the ship this early in development.

As far as construction material was concerned, it was not difficult to make a choice here. There being no more practical, durable, corrosion-resistant and fire-proof material than 24ST Alclad, the men decided to make the ship an all-metal one.

Following that came the high-wing versus low-wing debate. Analysis showed that if a low wing were used, the prop clearance would necessitate the wing's being at least four feet above the ground. And that would mean the fuselage, too—quite a long step up! Therefore, a high-wing was decided upon. The practical bonus to that

(Continued on page 59)

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Combat Control

(Continued from page 16)

southeastern United States, is the only operational group, although several smaller units trained by the 502nd are engaged in control work overseas in critical areas under U. S. administration. The 605th Tactical Control Squadron of the 502nd, stationed at Greenville AFB, S. C., also headquarters for the Ninth Air Force, is the operating squadron for the main control center. The 606th, stationed at Shaw AFB, S. C., and the 607th, at Turner AFB, Ga., operate the direction centers, direction posts and all the radar nets that make up the control and warning system.

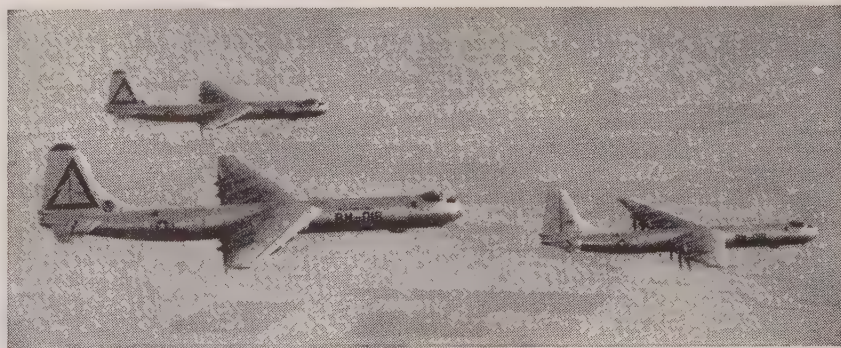
The heart of the entire network is the Tactical Control Center and, tailored to the principle of complete mobility, it has been skeletonized to a basic equipment list and manpower strength that is transported in five 2½-ton trucks—two trucks for the 24-by-40 feet of Janesway shelter, two for personnel and one for the rest of the equipment.

Set up for action, the control center with its multiple radio masts (large but mobile) is usually near a Joint Operations Center which is headquarters for the staff representatives of all the services in a battle area who evaluate reports and determine mission priorities. Also close by is a Tactical Air Force command post and an Army command post, both to interpret and decide orders affecting their respective forces. All the units of tactical control are operated in liaison with the units directly affected all the way up the command line, from the observer teams in the front lines to the radio-control jeeps, direction centers and direction posts, and in the chain of command, from battalion to regiment to division to corps to army at the main center, or directly from each to the TACC.

Under the arched, tarpaulin-covered framework of the Janesway, about 70 officers and men operate the tools of control. In the center is the focal point of all activity, the plotting board with its area map covered by a plastic sheet with superimposed grid of code markings and measured squares. One side of the shelter is flanked by status boards behind which are many of the radio and telephone junction boxes and switchboards. The status listings include separate categories for missions, radar stations, communications, weather reports and the aircraft frequencies in all channels of the air force groups under the center's control.

The remainder of the space in the shelter is taken up by the tables and interphone positions of the men who make up the center's staff and a second, smaller, mapped table which is used by a direction-finder team.

To demonstrate the complexity of the job categories that go to make up one center, the following is a partial list of the men responsible for communications in the TACC alone: tactical air controller, assistant controller, radio intelligence officer, identification officer, floor supervisor, anti-aircraft artillery liaison officer, communications officer, radar filter officer and the direction finder team. Added to these are the men who handle the markers on the plotting board and their supervisors,



NEWEST AND LARGEST of the Air Force's operational bombers, the B-36's, are shown here in formation over Fort Worth, Texas. This 139-ton ship is powered by six Pratt & Whitney engines, arranged in pusher position

the status board men and the equipment operating personnel.

The plotting board is similar to conventional types used during the war. Marker pieces include circular disks printed with operation codes to indicate targets and small notched standards holding information clips which designate aircraft movements in the control area. Colored clips at the tops of the standards show the type of aircraft and origin, if known, while numbered squares down the lengths of the columns give the observers the makeup of each formation. The top side clip of the numbered squares gives the target number; the center piece, the number of aircraft involved and the bottom card, the altitude of the group in thousands of feet. At the bases of the aircraft marker standards are placed colored arrows which show the direction and estimated speeds of the aircraft formations. Other symbolic markers may be placed to indicate units and movements of allied services.

This, then, is the Tactical Control Center, the brain for receiving, correlating, directing and transmitting all the information that comes in over the radio nerves from the outstretched tentacles of the warning system. The plotting board gives the constantly changing picture provided by information that may have come from: 1) a tactical direction center near an airfield communicating via VHF and FM which also might provide an FM relay for outlying light warning radar; 2) nearby light warning radar stations (between 25 and 50 miles from the TACC) which transmit directly by FM; 3) direction finders reporting over VHF and FM channels; 4) direction posts using VHF and control posts using VHF and an HF channel from distant positions with outlying main bodies of artillery and troops, themselves in constant communication with ground observer teams and radio-control jeeps; 5) tactical and liaison aircraft in the control area; 6) constant weather reports from airfield observers, and 7) special types of search and estimation radar.

While the primary mission of the Tactical Control Group is deemed to be air warning and fighter control, it is actually a complete command location system handling air-ground communications necessary in tactical warfare.

It is constituted to correlate attack and defense tactics involving all types of operating aircraft in its control area, all the concomitants of a ground army, and naval units operating off-shore when it is covering land-sea maneuvers.

Coordinated with the Joint Operations Center, representing joint staff direction, the TACC becomes the central communications agency for any type of tactical activity planned under the sky cover of the Tactical Air Command.

The system is intended to direct the operations and movements of entire tactical organizations within more than 10,000 square miles of territory without ever neglecting the smallest segment of each organization. Naturally, the human element still exists, with all its frailties in the stresses of combat, but if all the manifold wonders of ever-improving radar and radio observation can make it possible, the Air Force, Army, Navy and Marine Corps can move within each other's spheres of operations with maximum support extended to each by the others, and especially by the air to the ground forces. Piloting a military airplane becomes less and less an independent procedure.

As contrasted with many service units whose activities have largely military applications, the 502nd Tactical Control Group has demonstrated on its movements throughout the U. S. and Alaska that its peacetime activities can be important, too. By means of its direction finder system, it has aided commercial, military and private pilots lost or in distress, and its radar network has also picked up and tracked developing storms, reporting their movements to meteorological stations.

Its peacetime military activities consist largely of training new units, providing air-ground control, communications and aircraft warning for all types of large scale maneuvers, and the development of improved methods of tactical control for any eventuality.

At a recent combined operation an Air Force pilot was overheard saying to a Navy pilot, "We can talk to each other because we speak the same language, but when the problems get up to our bosses they always seem to need interpreters." Perhaps a Command Control Center patterned after the successful TACC might provide the solution to the service unity problem, too.



Lt. Putt-Putts

(Continued from page 19)

by Captain Harold F. Brown, USMC. Unlike the old hit-or-miss system, the invention enables the OY-1 to make a successful pick-up under almost any condition. The gear consists of a long rod with a hook on the trailing end, hinged to the plane's underside. It can be pulled up under the plane by the backseat passenger after the pick-up is made, by a string attached to the rod, and the message is then within reaching distance of the passenger. The message is placed in a small sack fastened to a line rigged loosely between two up-rights about eight feet high.

VMO-1, stationed at Peterfield Point Airfield, Camp LeJeune, North Carolina, serves as aerial spotter and reconnaissance units for the Second Marine Division. These planes render invaluable assistance to their Marine Division in locating lost amphibious equipment and supplies and by performing other duties.

All the OY's are equipped with Medium High Frequency radios which allow transmission and reception on two channels, making it possible to maintain constant communication between individual planes, central control, and the units with which the planes are operating in support.

In the early part of 1947, when the Marines were evacuated from Communist-threatened China, the Grasshoppers were there on the job. Used to check railroad

lines ahead of the trainloads of Marines and Army personnel being transported to Tangku, they avoided many a possible ambush and insured safe passage of American forces.

Grasshoppers got their first real start early in the Pacific War when they were given the job of directing artillery fire to successfully knock out Jap positions.

Two Piper Cubs were issued to each artillery battalion when the First Marine Division was preparing for operations against New Britain. Most of the men answering the call to pilot these planes were PFC's and Corporals and the only extra compensation they received was the enjoyment they got out of the unusual training and the strange missions performed.

About the same time the planes had proved their usefulness at Cape Gloucester, the newly organized Aerial Observation Department at Quantico, Va., had thoroughly trained officers to replace this first Observation Group. One pilot and one member of the ground personnel for observation were assigned to each plane. Six Observation Squadrons, (VMO), took shape, and each was assigned to a Marine Division.

When these Grasshoppers were placed aboard carriers, bound for the various islands, they were dwarfed alongside the big Hellcats and Avengers on the flight deck. Pilots of the planes were nicknamed "Lieutenant Putt-Putts" and they kidded themselves into naming their planes such things as: "It Flies, Don't It", "Gawd-

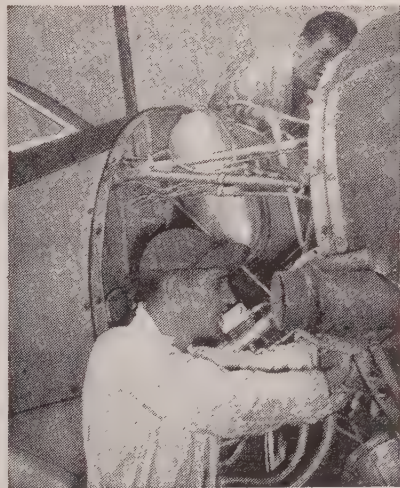
amighty, Jr.", "\$75,000 Education", "Please don't shoot, Grasshopper Group", and "War-Weary Willy". Much of this was a cover for their real conviction—that theirs was a foolish, dangerous, suicide mission.

Pilots' fears were soon changed to confidence, however, for the "Mighty Midgets" proved they were worth their weight. The men have seen their tiny craft weather typhoons, blister in the hot tropical sun and, covered with biting coral dust, still hang together and fly.

The planes' ability to operate on short runways, hover over the enemy at speeds as slow as 45 mph, and carry loads up to 2,200 pounds has proved the versatility of these Consolidated Vultee (Navy OY-1) planes. The pilots learned to trust their Grasshoppers as a Marine trusts his rifle.

Today, the Marine Corps assigns pilots for duty with these VMO squadrons from the ranks of pilots of other types of aircraft. They are not kept on this duty permanently, but are reassigned periodically to heavier aircraft units. Most men who are assigned this duty from fighter and bomber squadrons expect to find it boring, but after a brief tour with the outfit, they all seem well pleased with the flying they are doing.

Present and ex-Marines all over the country can tell you of the commendable record of these tiny planes. No matter what the assignment, Lieutenant Putt-Putts will always be on the job, giving forth with their permanent plaintive protest of, "It Flies, Don't It?".



T. B. LYONS, President
B.S., M.A., Ph.D.

Dr. T. B. Lyons, President and Treasurer, has had wide experience in school administration and aviation. He was for many years connected with the Pittsburgh Board of Education, and was General Manager of the Graham Aviation Co. which operated a Primary Training School for the U. S. Army Air Forces at Souther Field, Ga. Dr. Lyons is a graduate of Lock Haven State Teachers College and the University of Pittsburgh and is listed in WHO'S WHO in American Education. He assumed his duties at P. I. A. Dec. 1, 1944.

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X-C... Dusk to Dawn

(Continued from page 22)

after dark flying on a cross-country trip.

None of the three pilots had flown anything heavier than a PT-19 until they climbed aboard the *Navion* in Los Angeles, so the first part of the trip was made in daylight to acquaint them with the airplane. One daylight gas stop was made at Prescott, Arizona, where the new plane was checked over to make sure everything was okay.

Darkness descended over Albuquerque, N.M., and we radioed the CAA range station to check and be sure fuel would be available after hours at our next stop, Tucumcari, N.M.

As the sun dropped away behind us, the winking glow of rotating airways beacons began to dot the darkness ahead. There were 1,777 of these pilot's helpers throughout the country at the latest count. A total of 630 radio range stations and 188 CAA lighted fields also help the night-owl pilot.

"How can you tell that you're not going to plow into a mountain out there in the darkness?" asked Rex as the horizon dimmed in the darkness.

"That's no problem," we explained. "The instrument altitude, according to the radio facility charts, is 11,000 feet East-bound between Otto Radio (34 miles east of Albuquerque) and Tucumcari. That will give at least 1,000 feet of clearance above the ground so long as we're within 12½ miles of being on course."

"But how can you tell when you get to the airport?" asked Coffey.

"That's easy. You can see plenty of lights when you get close to a field located in this wide-open Western country. In fact you can spot a field 30 miles away on a clear night like this by the green flashing light. There is one way out ahead.

"Now pick up the map and see where the town of Tucumcari is located in relation to the airport. That's just the same as flying in daylight."

Over the cluster of neon that was Tu-

cumcari, we picked up the radio microphone and called "Tucumcari Radio from *Navion* four-five-two-six-king..."

The speaker in the dome of the cabin blared back... "Navion two-six-king, this is Tucumcari Radio."

After having established contact, the radio in the *Navion* continued with a position report. "Tucumcari Radio from two-six-king. Letting down over town at seven thousand. Request landing instructions."

"Two-six-king. Wind east north east ten. Altimeter three zero two eight. Use runway eight."

All was quiet in the cabin as we Rogered-out to the man behind the phone and set the Kollsman number on the altimeter to the 30.28 setting.

"OK," said Coffey, "How can you tell which is runway eight?"

"Rather than make a straight-in approach, let's circle the field once and see. Runway eight, remember, is 80 degrees. Now fly along side the field on a compass heading of 80 and see which runway is parallel to you. That's runway eight."

"Now slow up to 100 and get the gear down."

As the airspeed needle dropped to 100, the hydraulic boost control was snapped on and the gear lever dropped. A bright amber light flashed on the panel and almost blinded us until we found the high-low switch and dimmed the indicator lights. The red "unsafe gear" light changed slowly to three green lights as the tricycle gear came down and locked. A quick check on the throttle horn further assured us that the gear was down and locked as we turned on a wide base leg.

At out-of-town emergency fields like Tucumcari, there is no control tower and the CAA range operator does not handle local traffic. He is in telephone communication with the airport operator, however, and can relay landing instructions.

Turning in on a high final approach, we snapped on the landing lights.

"Man, look at the beam of those lights," exclaimed Rex from his copilot's seat.

As full flaps were dropped, the lights

angled downward with the steep glide of the plane and illuminated the plowed corn field adjoining the 5,100-foot runway.

"On a long field like this, keep your speed on the fast side at night," we advised, coming across the fence at a fast 80 mph.

"Keep just a little throttle on to ease the plane down to the runway and snap it closed as the tires squeal. With a wide tricycle gear like this, night landings are no problem—visibility on these new jobs is so good."

The *Navion* touched-down and Rex exclaimed, "Gosh, that's a snap. You can see the runway easily and there's just nothing else to watch."

Into the microphone we said "Two six king, on the ground. How do you get to the line?"

On any strange field at night, it is hard to keep your bearings among the maze of runway lights, rotating beacons, obstruction lights and hangar lights. Once safely on the ground, therefore, it is well to ask for instructions. On a large metropolitan airport, these would come from the control tower without asking, but not at the smaller fields.

"Two six king," replied the radio, "Taxi on down to the end of the runway, turn right and taxi back to the intersection; turn right again and follow the taxi strip to the gas pit. A man with a flashlight will park you there."

And he was right.

The temperature on the ground was in the low 30's and we enjoyed coffee and sandwiches at the little airport cafe while the *Navion* was being fueled.

Before take-off, we stopped at the CAA communications and radio range building. Here was "the man behind the phone."

"What have you got," we asked, "between here and Wichita?"

A quick check through the teletyped weather reports showed visibility better than 15 miles, temperature 38, dew point 30, wind NNW 25 with strong gusts along our course. Our best altitude was 9,000 feet where winds of 22 mph pushed from 280 degrees (WNW).

We filed a VFR (Visual Flight Rules) flight plan to Wichita. With a flight plan, there'll be someone looking for you if you don't show up at your destination. After a "thank you" to the CAA man, we walked out into the cold night.

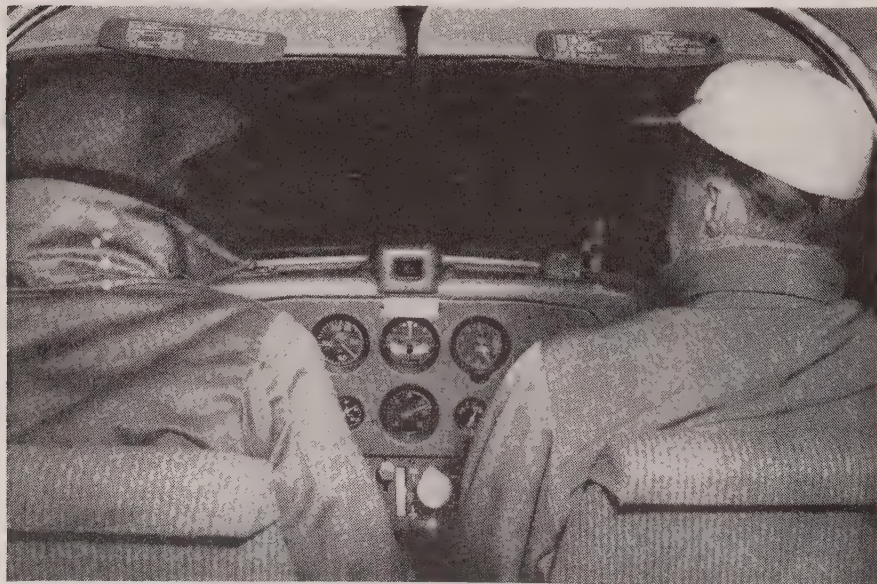
Before take-off, we borrowed a foot of masking tape from the gas attendant and stuck it half-over the too-bright indicator lights. There was still more than enough glow from around the tape, and yet no tendency to blind the pilots.

After a slow engine warm-up, we taxied to the west end of runway eight and pointed the nose of our *Navion* down the runway. After making sure that no cows were on the flight strip, we turned off the landing lights.

"Why not leave them on," asked Coffey who now sat in the driver's seat.

"Two reasons—and they're both merely personal preference. First, it makes just one less thing to do after take-off. On the *Navion*, the lights are on the landing gear struts and it is possible to forget to turn them off when you retract the gear. Then they'd burn for the whole flight. Secondly

(Continued on page 50)



NOSED into the night, this photo was taken while the *Navion* winged its way between Wichita and Kansas City. The author (on the left) was at controls. Copilot was George Rex

Quit Stalling Around

(Continued from page 33)

ducted by Prof. P. J. Rulon, a commercial pilot himself, of Ward University, after investigations had shown that almost all of the serious accidents in private flying were caused by inadvertent stalls leading, in many cases, to spins.

The first series of tests was made in an Aeronca Champion tandem trainer. This airplane was fairly familiar to all the 254 pilots tested. A later series of comparison tests was made with 119 pilots from the first group but this time an unfamiliar plane, an L-2M Taylorcraft 65-hp liaison plane, was used. Although of quite similar type these airplanes have different flying and stalling characteristics. Pilots of student, private, flight instructor and commercial ratings were included in the tests.

The airplanes were equipped as standard training ships except for five indicating vanes were mounted in the left wing of each. Each vane, a standard wing unit of the Safe Flight Stall Warning Indicator, was essentially a device to indicate when the wing had reached a certain angle of attack. Thus, number one indicated at an angle of attack something over that for normal climb or glide (that is, at an airspeed less than that for normal climb or glide) and number 5 vane indicated just the stalling angle of attack. The other three vanes indicated approximately equal intervals between numbers 1 and 5. The vane, when it indicated, operated a switch in the wing which turned on one of the five small lights mounted on a board held by the check pilot giving the test.

During the tests the pilot could not see the clipboard and as but the check pilot could tell by the number of lights just how close to the stall the pilot being tested was flying. When number 1 came on it meant that the pilot was deviating from normal flight in the direction of the stall. It was possible to fight the first four lights in all maneuvers without stalling. The aim in the assigned stall approaches was to light four lights and maintain flight in that condition. Between assigned maneuvers the pilots were told to fly in normal flight but were told that they were being checked to see if they inadvertently approached stalls. The assigned maneuvers included flying the plane as close to the stall as the pilot could, without actually stalling, through such approaches as straight ahead climb, climbing turns, gliding turns and steep turns at altitude. Between these assignments the flying included straight-and-level flight and normal climbs and glides. The check pilot also noted the number of lights lit during the normal approach, the traffic pattern, flight in the pattern and in the final glide approach to the field.

The precision of the flying during the tests was considerably less in the unfamiliar plane than in the familiar plane and the instructors' performance was better than that of other pilots. It was nevertheless generally considered inadequate. Prof. Rulon's report suggests that this lack of precision on the part of the instructors, who had as high as 5,000 solo hours flight time, may account for some of the poor performance of the student and student pilots through insufficient training. However, the purpose of the tests was not to find fault with instructors but to show of how little value "seat of the pants" flying might be near the stalling point.

In the Aeronca 3 per cent of the pilots stalled when they didn't have and 15 per cent didn't come close to the stalling when they were trying to. Flying the Taylorcraft about 10 per cent stalled and about 20 per cent didn't come close. In the traffic pattern and final approach, where pilots would be expected to stick close to normal flying, about 3 per cent of the pilots lit from two to four lights in both airplanes. In normal flying between the assigned maneuvers 3 per cent of the Aeronca pilots and 20 per cent of the Taylorcraft pilots flew too close to the stall on several occasions.

As a result of Prof. Rulon's report the Committee of Aviation Technology of the National Research Council has recommended compulsory installation of stall warning devices on all private airplanes. At present, though, the CAA doesn't anticipate any immediate compulsory requirements but believes that eventually indicators will be on virtually all aircraft that aren't spin-proof.

Mandatory installation of stall warning devices would

(Continued on page 63)

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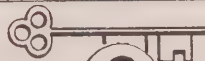
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TRAIN IN MIAMI--AIR CAPITAL OF THE WORLD

X-C... Dusk to Dawn

(Continued from page 48)

—it makes it easier to see out after take-off because your eyes are not blinded by the brightness of the landing lights. You've got the runway boundary lights ahead, and that's all you need."

We poured on the coal and climbed out to 9,000 feet. Only 7,000 is needed to clear all the obstructions eastward over Amarillo, but the CAA reported better tail winds at higher altitudes.

At 9,000, we leveled off and tuned in the Amarillo radio range station ahead. His half-hourly weather report showed no change in the ideal night so the radio was switched to a disk jockey's program in New Orleans for a short relief from the steady on-course hum of riding the range.

At night the air is normally smoother than in daylight because there is no radiation from fields and lakes. We did, however, hit one patch of rough air over Pampa. There seemed to be no reason for this particular turbulence; no thunderheads, no lakes on the ground and no mountains in sight. The "bumps" lasted for five minutes and then the air was again tranquil. Perhaps it is just psychological, but engines always seem to run better at night. Actually, they run cooler because of the low outside air temperatures.

It was cold in the cabin and we all huddled in flight jackets. At this writing, cabin heaters are still extra equipment on the *Navion*.

Over Amarillo, we called in our position report after establishing contact with the range station.

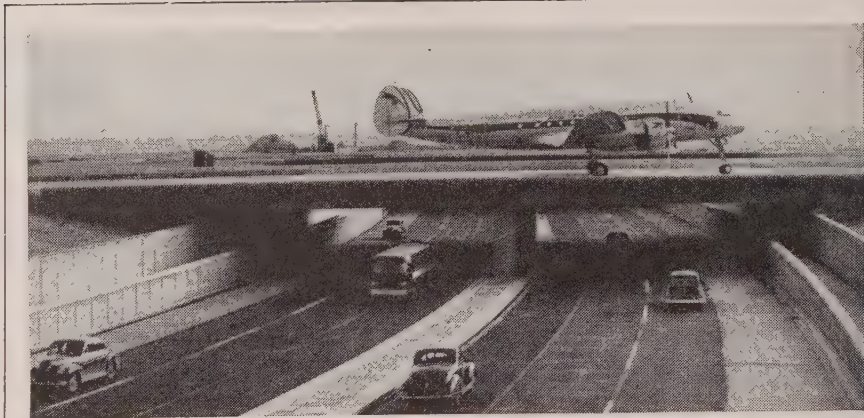
"*Navion* two-six-king. Over your station two-two, at nine thousand on a victor fox roger flight plan from Tucumcari to Wichita." (i.e.: *We are over your station at 22 minutes past the hour at 9,000 feet on a visual flight rules plan Tucumcari to Wichita.*)

The Amarillo Radio then gave us the latest Wichita weather which showed a wind shift from WNW to NNE. Rather than crowd our fuel supply and land at Wichita with about 5 gallons in our tanks, we changed our flight plan to land at Gage, Oklahoma.

None of us had ever been on the field at Gage, so we called in for complete landing instructions while letting down. A 25-mph gusty wind was reported from the north and we were to land on runway 36. The radio advised that there were no obstructions surrounding the field.

Coffey, who was flying, slowed the the plane down and dropped the gear. The indicator lights glowed softly behind the tape. We circled the field and turned in on the base leg for a landing. Because of the strong surface wind, Coffey was drifted away from the field and had to add considerable power to drag the *Navion* into the field. Because of the gusts on the ground, he maintained nearly 100 mph without flaps as he crossed the boundary of the 5,500-foot lighted gravel strip.

Pilots on their first night flights usually come in too low on their landings. An easy way to keep out of trouble is to fly the downwind leg at 1,000 feet above the airport, drop to 500 feet on the base leg and carry an extra 100 to 200 feet on



Airplane Roadway

New York's International Airport boasts one of world's first roadway underpasses which permit simultaneous movement of aircraft and surface vehicles. This Air France Constellation is taxiing from hangar area to loading area where passengers will board plane for transatlantic flight. Plane roadway cost \$4,250,000

the final approach. The average lighted runway is plenty long enough to handle a moderately high approach.

It was even colder at Gage than at Tucumcari, and there was no cafe on this out-of-the-way field. However, the operator invited us into his house for coffee while he gassed the ship. Our later experience on this night flight showed that the smaller the field, the faster the service.

With no telephone to the CAA station, we filed our flight plan by radio as we warmed up the ship. Once in the air, we relayed the airport operator's message to the CAA man to "turn out his extra lights," and as we looked back, half of the runway lights winked out.

These nocturnal hops became more and more routine as the moonlight night wore on. The Doc climbed into the front seat as we headed out on the short 164-mile hop to Wichita. Increasing headwinds slowed our ground speed to 125 mph as the town lights shimmered below us.

The whole map is different at night. Towns show up far more distinctly after dark, and it is easy to mistake smaller suburbs for faraway large towns. Oil wells and refineries that don't even show up on the map look like towns from the air. On a clear night like this, it is easy to misjudge distances. The municipal airport at Wichita has a string of bright redish approach-lights to aid pilots on instrument landings. The lights are visible for 50 miles on a clear night—so we called in for landing instructions to the Wichita Tower and red-facedly flew for nearly 20 minutes before we reached the airport.

We kept our cockpit lights as low as possible to make it easier to see outside the plane. Many pilots on night flights use either their cabin lights or a conventional flashlight to read maps. The great disadvantage of this procedure is that, after looking into the bright white light, it takes a number of minutes to completely reaccustom your eyes to the night blackness. On this flight, we used a cheap drugstore flashlight with a red shield over the light. Medical research has established that red-colored light is more restful on the eyes and they will more quickly return to top

efficiency at night than with white light. The only problem in reading maps with red-colored light is that the radio range and tower frequencies, printed on the maps in red, appear almost white in the red glow.

Wichita was the first field where a DC-3 landed that had both a radio range station and a control tower. The range station is utilized for weather reports, position reports and any other messages covering the actual cross-country flying. The tower, on the other hand, is used only for messages covering local traffic and actual landing.

In response to our first call, the Wichita Tower replied, "*Navion*, two-six-king, two miles west at 2500 feet. You are clear on a straight-in approach. Landing is from the north. Wind 25 with gusts to 30. There is a DC-3 now on downwind leg."

The airliner was safely parked on the loading ramp before we landed. The new approach lights are much too bright for comfort on a clear night, but the transition pilot has no difficulty in spotting the broad 7,500-foot paved runways. Because of the gusty surface wind, we again landed without flaps and eased the plane down on the runway under partial power. On first landings of this type, it is easy to overcontrol on the flare-out and pull the ship back into the air rather than merely leveling out. But with a long runway, you just try it again.

We asked the tower to close our flight plan as we taxied up toward the brilliantly lighted administration building.

"Two-six-king. Your flight plan is ready closed," advised the tower. "Follow the light from the tower to the parking area."

At Wichita a light gun is used to "paint" the runway in front of visiting ships, directing them along the taxi-ways. This keeps the two-way radio channel clear of other landing instructions.

We followed the spot-light around the airline loading area and into the lightplane section. No one came out to meet us, we parked next to a twin-Beech and turned the switches.

(Continued on page 56)

Plane Parrots

(Continued from page 17)

experience by at least six other airmen. It is only human nature, I suppose, to get bored, but pilots would do well to remember what Wilbur Wright said many years ago when asked to recount some of his experiences: "The bird that talks the most about flying—does the least flying."

Now that the woods are full of pilots who were during the war, there is a veritable storm of flying yarns. The oldest hand-tales have been resurrected. Some of them have been dramatized on the radio with authentic recent happenings.

One favorite anecdote involves two pilots who were making a X-C. Pilot Bill, in the rear cockpit, was doing the flying when he observed Pilot Joe, up front, tap the head—the signal that he was going to take over. Bill relinquished the controls.

A little later, as they were passing over a well-populated area, the engine cut. The plane started down in a shallow glide, skillfully avoiding several large buildings, and squeezed into a vacant lot, the only open space for some distance around. The landing gear was wiped off, but otherwise the plane suffered only minor damage. As the dust settled, each pilot held out a hand to congratulate the other.

"I wasn't flying," Bill protested. "I thought you were. You tapped your head like there a ways."

"Tapped, nothing," explained Joe. "This helmet I'm wearing made my head itch. I was scratching."

As the ship had just landed itself—just the start of the day's fun for the nonchalant flying aviators. If anybody ever tries to tell you that one, give a long loud laugh. Instructors have a repertory of stories all their own. I recently heard one of them telling his wings to a fare-thee-well at a dinner party. Here is the *piece de resistance* of his performance, a story which goes back to 1917, before he was born:

"This cadet I was instructing had been coaching for landings over a plowed field adjoining the airport, judging his altitude by the width between the furrow. When he had made some excellent landings, I decided he was ready to solo. It was beginning to get dark, though, so he was to wait until the following day.

Next day, I stayed on the ground and let him go around by himself. As usual, he glided in over the cultivated field, but instead of levelling off at the proper time he flew right on into the ground.

When I rushed over to the wreckage, a poor guy was looking at the furrows. "What does he mean by this field has just been raked!"

"I must confess I was a little surprised the other day to renew my acquaintance with a story I heard in ground school 20 years ago. I thought it had long been invented, but a pin-whiskered young birdman told his audience in gales of laughter when he told it as a recent experience of his.

The girl I was carrying was awfully shy," he related. "Dimpled blond with baby stare—oh, you know the type. I don't know which end of plane went forward. We were in a tandem ship and she was sitting in front of me. I hadn't both-

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ered to disconnect the dual controls.

"Once or twice during the flight she turned around and shook her head at me, but I had no idea what she meant.

"Then we came in to land. As we began to lose flying speed, I eased the stick back between my knees. Of course the stick in front of her came back between her knees, too.

"'Oh, don't do that!' she squealed—and playfully pushed the stick away from her! Flipped us right over on our back, too," the pilot added.

The story that takes the blue ribbon is the one I heard related in a tavern by a

cowboy pilot from Texas. He had the eyes of a waitress almost popping out when he told her about how he had been killed one time.

"Killed dead—n a hung horse thief," he drawled, nodding his head solemnly. "They had me stretched out in the morgue when a doctor come around and squirted some adrenalin in my heart and got it pumping again. Bet you never met a dead man afore, now did you?"

The girl scuttled off to the kitchen to tell her colleagues the amazing story and I winked at the pilot. He didn't wink back. They never do.

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Flying Stars

(Continued from page 38)

From Castile" was shooting down in Mexico, Cobb took to the air, shuttling between the location and Hollywood for weekends with his family.

Cobb, whose first plane was a Waco, has logged over 600 hours, has an instructor's and instrument rating as well as a commercial license, and served in the Air Forces during the War.

Powell, too, gets full use out of his *Bonanza*. It is privately hangared at Metropolitan Airport in Van Nuys, and as Powell sees it, maintenance cost is not much greater than on a car.

"Considering the time I save," Powell declared, "it's not too costly a deal at all. I had to go down to Flagstaff, Arizona, when we were making 'Stations West.' I did it in two hours and 40 minutes—a great deal faster than I could go down there any other way."

Powell also uses the *Bonanza* on business for his new National Flight School, of which he is the president and guiding spirit.

In the Powell family it's Dick who is the enthusiast. His wife, M-G-M star June Allyson, refuses to leave the ground. To get Miss Allyson and Claudette Colbert, who is always a little shy about flying, up for a contemplated jaunt to San Diego, Powell and Dr. Joel Pressman, Claudette's husband, had to resort to a little trickery.

"I told June that Claudette was going," grinned Powell, "and Pressman told Claudette that June was willing to go. We got them into the plane before they had a chance to compare notes; then, after we were on our way, we told them the truth. But," he added ruefully, "I must admit that June would much rather remain on the ground."

Few of Hollywood's studio executives object to their valuable stars' learning to fly, but there's a typical Hollywood twist to the way radio singer Dick Haymes acquired his first plane. Haymes' manager, Bill Burton, gifted the crooner with an *Ercoupe*—rather an unusual present, some would say, for a ten-percenter to give a client on whom he depends for *crepe suzettes* and *filet mignons*. But Haymes, who began flying about a year ago at Jon Hall's Clover Field in Santa Monica, now has his pilot's license. He has since traded in the *Ercoupe* for a *Navion* and has made a number of hops on personal appearance tours and in connection with his radio broadcasts.

Probably the pioneer flying movie director in Hollywood is Henry King, who owns a *Bonanza*. King has been flying since 1918 and is one of the first directors who ever went hunting for picture locations on wings (See *Skyways*, Nov. 1945). From the air, King spotted locations for "Jesse James" down in the Ozarks; for "Little Old New York" he found the perfect locale in a little hamlet on the Hudson River; chose Morelia, Mexico, for "Captain From Castile" and the University of Nebraska for the high school background in "Margie."

"You can cover more country in four days in a plane on a location hunt," says King, "than you can cover in four months

any other way. But ironically enough while we use a plane to spot location don't dare use a location that is situated on an airline. The noise from the ports ruins our soundtrack."

A 90-minute location hop once King and his studio \$150,000. It was in 1935, when King was directing Gaynor and Henry Fonda in "Way East." The exterior location shots had been completed, with the final one of Miss Gaynor running in a field of trying to catch a colt. King moved the party back to Hollywood and told the who owned the oat field that he could ahead and harvest it.

"But three days later," King r "Gaynor fell down and banged her head that it gave her a concussion doctor told her to lay off for three months. We decided to change the cap put Rochelle Hudson in her place. I find a field of oats in which to make ups of Rochelle. The art department for an oat field by car for almost weeks. There didn't seem to be an oat standing this side of Oregon. A friend mine has a plane and I told him what I wanted. In less than 90 minutes he three oat fields, all within easy travel distance of Hollywood. That hour half was worth a hundred and fifty sand dollars to us."

It was King who made a flying e iast out of screen actor Tyrone Power flew down to the "Jesse J location with the director, became ested in flying then and has retained enthusiasm ever since. During the the actor flew with the Marines a pan and Okinawa. Upon his discharge November, 1945, Power bought him 8-place, twin-engine Beechcraft and a 20,000-mile jaunt to South America. His latest exploit is a trip to South covering some 30,000 miles in a com DC-3 with a crew of five.

Still another famed director who been flying since the first war, who was a pilot in the Air Corps, is M. Clarence Brown, the man who has phoned such productions as "The ling," "The White Cliffs of Dover "National Velvet." Brown commutes larly between Hollywood, his ran Calabasas and virtually all points a compass. He has two planes—a S L5C ambulance-type and a new *Bonanza*. He hangars both on his For special flying he uses the S because it requires only a short run takes off easily and gets into almost cessible places for landings. He has up the Stinson with another seat the stretcher once was, giving the more passenger space. Brown travels entirely by air, using either the B or the Stinson, depending on the p of his trips and his destination.

"I've never kept track of my ho the air," said Brown, "but I guess logged more hours than I can cou

Flying is not only a hobby but a ness, too, with stars like Jon Hall a songstress wife, Frances Langford; Autry, Edgar Bergen, Dick Powe Andy Devine. Hall and Miss La together operate the Clover Leaf A Service at Santa Monica's Clover

elling *Ercoupes* and *Navions*, providing flying instruction, renting and servicing planes—everything for the sportsman pilot. Currently the Halls, who do a considerable amount of flying themselves, are planning to go ahead with a half-million dollar project—a deluxe flying country club in which memberships will be available by invitation only. It will be an airmen's castle with a variety of plushy services and will soon get the green light, now that Hall and Miss Langford have been given a 15-year lease by the Santa Monica city fathers.

Gravel-voiced Andy Devine, whose plane is a Stinson 165 "Station Wagon," manages to find time for his Probert-Devine flying school up in the Pacoima Valley, between playing in Roy Rogers' oat operas. Devine's school has a GI contract, operates eight planes with a number of instructors and teaches flying to as many as 100 men at a time.

"Quite a few traveling salesmen," Devine said, "come up and rent planes from us for business trips, flying the planes themselves or hiring a ship and one of our pilots."

It's Andy's idea to start a "Trip-of-the-Month" Club for people interested in flying, taking them out on a kind of mass flight on a different trip every month—down to Mexico, up to Wyoming or any one of a hundred other off-trail spots. Busy as he is with picture work and his school, Devine still aims to realize one of his chief ambitions: to see some of that "Wild West" in which his horse op'rys are supposed to take place. So far his visits to the rugged West have mostly taken place at the sound stages at Republic studios! While comedian Edgar Bergen uses his airchild 24 or his *Navion* for vacationing, movie hunting and fishing, a quick hop to Palm Springs or Santa Barbara for lunch "just for the hell of it," as he says, he is also in flying as a business. Edgar and his brother Clarence own "Sky Motive, Inc." which operates the East Los Angeles airport near Montebello. Two approved flight schools are now operating at the field, which has a 3,400-foot paved runway and hangs some 15 planes. Bergen has logged 1000 hours and has been flying since 1939. And now Edgar's wife Frances has just blooded, so that she can take over the controls when the Bergens go sky-touring.

Cowboy star Gene Autry not only owns a flying school in Phoenix, Arizona, but a virtually a one-man air line in his own right. The singing cowboy, who first learned to fly at Luke Field after he went into the Air Forces, now owns a twin-engine Cessna as well as two 5-place Beechcrafts, both equipped with practically all the instruments of a commercial transport. For his personal plane Gene pilots one of the Beechcraft, flying from coast to coast with his Rodeo, on personal appearances and in connection with his many business interests. Autry is considered one of the top private pilots in Hollywood and has a 400-hour commercial license.

Among the screen stars with the greatest number of years of private flying to his credit is Robert Cummings, who started flying in 1927, when he was only 18. Cum-

Operational Engineering

(Continued from page 44)

then into the vertical duct at the end of the assembly. This air is drawn into the fan section of the turbine and passes through the ambient air discharge line to the atmosphere.

Heat is transferred from the pressurized air flowing through the tubes of the cooler to the ambient air flowing across the tubes, removing the heat in the pressurized air with little loss in pressure.

The new cooler pressurized air which has come out of the heat exchanger goes through the top duct assembly into a chamber of the turbine assembly containing a ring of restricted passages, or nozzles. The compressed air forces its way through these passages at high velocity and strikes the blades of a turbine wheel which is mounted on a shaft running through the turbine assembly, causing the turbine wheel to rotate at 100,000 rpm.

In passing through the nozzles into the turbine chamber and along the blades of the high-speed rotor, the air expands and drops further in temperature. At maximum efficiency the turbine passes seven pounds of air per minute.

The rotation of the high-flow fan at the other end of the turbine shaft, drawing the ambient air through the heat exchanger, assures efficient operation of the system on the ground and requires no ram pressure since the expansion turbine is operated by the pressurized air originally drawn from the jet-turbine compressor. The temperature of the still-compressed air coming out of the turbine and delivered to the cockpit is controlled by a manually operated flow-control valve which serves to direct the hot compressed air from the jet engine compressor either directly to the cockpit or through the turbine and exchanger unit. The flow valve may be operated to produce a balanced mixture of hot or cooled air within the cockpit according to the pilot's requirements. At the time of the *Skystreak* record flights last year, the 90° cockpit temperature was maintained by air discharged into the cockpit at between 30° and 40° to balance other heat factors present.

It is only on inspection of some of the components of the system that it is possible to get an idea of the fabulous extent of the job done by this tiniest of high-power refrigeration system. The small turbine developed originally for the F-80, with a flow rating of seven lbs/min, weighs only five pounds and fits into the palm of a hand. The 10 lbs/min flow turbine for the Republic F-84 is only slightly larger, while a 20 lbs/min turbine for larger planes is only about twice the size of the small unit. The aluminum turbine in the palm-sized unit not only whirls at more than 100,000 rpm, but it is actually only the size of a silver dollar. This midget expansion turbine alone will create a temperature drop of 135° F and, coupled with the air-to-air heat exchanger, will cut the temperature of treated air approximately 500°.

Such is the "simple" refrigerating system developed by AiResearch for refrigerating the pressurized cockpits of jet fighter aircraft.



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HANGAR FLYING

Aero Medicine . . .

Mr. J. O. Womack, president of Mustang Aviation, Inc., of Dallas, Texas, is not a doctor, but he's certainly the doctor's right-hand man. Recently a Dallas man appeared at the airport with his two small children, both of whom had had cases of whooping cough. The distressed father approached Mr. Womack, then showed him a prescription from a doctor which read, "Babies need to take flight up to 10,000 or 11,000 feet for about 15 minutes to clear up whooping cough."

J. O. Womack loaded the father and sons into his four-passenger Cessna, and Pilot H. Wright flew the family over the city at the prescribed altitude and for the requested length of time.

A few days after that flight, the father happily reported to Mr. Womack that his children were decidedly improved, that they had coughed only briefly and did, in fact, seem almost cured!

Embry Riddle . . .

For awhile there was talk of the Navy's reactivating their base at Opa Locka, Florida, now the site of the Embry Riddle International School of Aviation. Fortunately for the many students at Embry Riddle, however, the Navy has decided against the Opa Locka reactivation plan, and so the Embry Riddle School will be continuing its operations there.

Girl Flier . . .

Airmen out Fresno, California way, and particularly those at Adams Airport, are proud of Betty Jean Graham, 18 years old, who recently was awarded her commercial pilot's license. Betty Jean began flying when she was 16 years old, received her private pilot's license on her 17th birthday, then her commercial ticket just a few days after her 18th birthday. It's quite possible, maintain the Adams Airport people, that Miss Graham is the youngest commercial pilot in the U. S. . . . mebbe so . . . mebbe so.

Business Flying . . .

After querying a representative cross-section of pilots, the CAA reports that the most active pilots are those who fly for business. Among the pilots who flew the most, 86 per cent gave as their purpose for flying either business or business and pleasure combined. Only 25 per cent in the least active group said they never flew for business.

This study, covering some 1,481 California pilots holding CAA licenses, showed that despite the common belief that flying is a "young man's game," the most active fliers averaged 33 years of age, that they usually had a commercial or higher grade license, and that they owned rather than rented planes.

Air Markers . . .

Time marches on and so does the air marking program. D. W. Rentzel, Administrator of CAA, announced recently that more than 4,000 air markers were installed during 1947 and 1948. Including the markers that were installed in 1945 and '46, there are now about 5,000 markers in

the country which can be called serviceable. A new paint job of those markers that were installed in early 1945 will add to the number of aerial signposts for the private flyer.

Goal to be reached before we can call the U. S. adequately air-marked is 100,000 serviceable markers. There remains much to be done, but . . . we're getting there.

Taylorcraft Moves . . .

It has been officially announced that Taylorcraft, Inc., is getting ready to move from its old home in Alliance, Ohio, to new quarters at the Conwaÿ-Pittsburgh Airport in Pennsylvania. According to C. G. Taylor, the company has outgrown its facilities at Alliance and expansion of Taylorcraft's activities necessitates the move to another area. Mr. Taylor also reported his company was getting ready to enter the four-place private plane field. At the present time production is limited to the two-place Taylorcraft.

Log Book . . .

If you're in the market for a new log book, you might have a look at the one put out by Charles E. Merritt, a commercial flight instructor, and published by Boone County Publications in Columbia, Missouri. This log book is actually a complete course in flight instruction. It covers everything from how to establish a radio fix to a detailed explanation of weather analysis. We recommend it.

On the Market . . .

A new airplane cover has been brought out by United Aviation Corporation at

Basking Ridge, N.J. Called Silicon Covers, one set comes in four sections and will completely cover the nose, prop, cowl and windshield of any high-wing lightplanes. This set retails for \$16. Wing covers are an additional \$39.

There have been mooring kits and mooring kits, but here's one that looks good to us. The complete outfit consists of three cast aluminum alloy stakes and three ropes, all neatly packed in a sturdy folding leatherette or canvas bag. The stakes are 15 inches long, with star drill points that enable them to be driven into frozen ground. The ropes are 5/16 inch #1 Manila with a tensile strength of 1,000 pounds. This equipment assures dependable and safe tie-down of any light or private plane on any airfield. Price . . . \$9.95; and the Distributor . . . Air Associates, Inc.

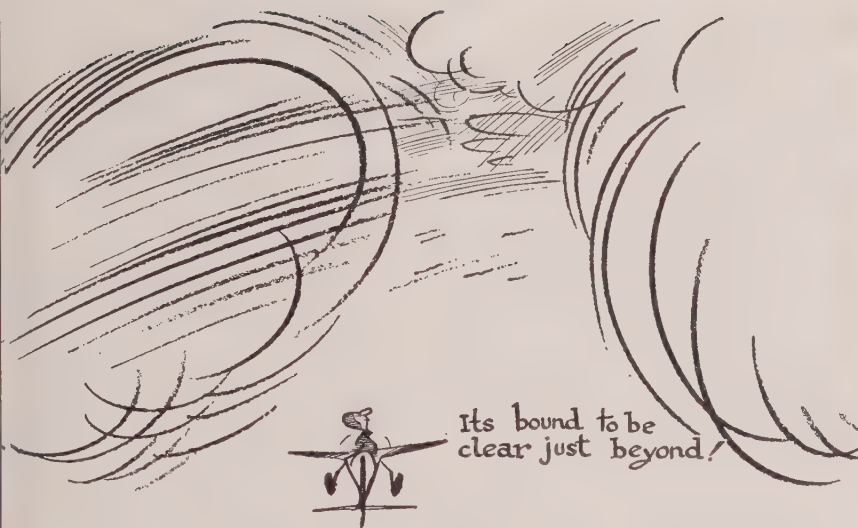
Jane's All the World's Aircraft, 1948 edition, is on the bookshelves now in its 36th edition. All the World's Aircraft is an illustrated collection of information on aircraft, engines, service and civil aviation organizations. It provides plans, photos, specifications and performance data of all planes, even those of Russia. It's the book for an aviation library. Released by The MacMillan Company, its price is \$20—and worth it!

P. S.

Texas Engineering and Manufacturing Company, of Dallas, has announced a \$500 increase in the price of both the deluxe and standard models of the Swift 125. New prices will be \$4,495 for the deluxe; and \$3,995 for the standard.

AIR-MARKING program continues to bring improvement to X-C flying. At Bethany, Conn., airport people painted this welcome sign as greeting to trans-Atlantic passengers





Its bound to be
clear just beyond!

Dilbert

(Continued from page 41)

plies with all safety precautions? If I carry on; this isn't meant for you. It is addressed only to that bunch of hard-headed egotists who, despite hell and high water, nonchalantly continue to disregard precautions.

The safe pilot usually has a well-developed bump of self-preservation. He is naturally careful. He realizes that safety instructions and flight regulations are the growth of millions of hours of flight experience, are based on the proved limitations of material and personnel, and are designed specifically for his protection. Compliance is easy for him.

But the daredevil is built differently. His bump of self-preservation never developed; in fact, he has a dent instead. He isn't worried about safety. He has supreme confidence in his flying ability; you know, the kind who can fly a barn door. He may even admit that safety precautions are all right, but only for beginners and average pilots. He feels he is superior, and to prove it to himself, and the world, he deliberately flouts safety regulations whenever he gets a good chance.

Of course, this attitude makes him a shoveler for the most common of all aviation accidents; those caused 100 per cent by pilot error—poor judgment, poor technique, carelessness, negligence, and disobedience of orders. The seriousness of this situation may be judged from the fact that about one out of every three accidents occur as the result of pilot error.

Face this thing squarely before your next hop. Check yourself on matters affecting flight safety (*your safety*): flight regulations and safety precautions, careful inspections, tedious cockpit drills, and the laborious and continuous study of the

countless things which go into the making of a good, real old, aviator.

Reverse Course—Everybody knows *how* to make a 180-degree turn, but only the smart pilots know *when*. Dilbert knew how. He was on X-C and ran into some heavy weather. He dodged around for awhile, then entered what appeared to be a light haze between two storm areas. Immediately after entering this haze, he heard a loud drumming noise. The war being over, it couldn't be machine gun fire, so he doped it out as a hail storm.

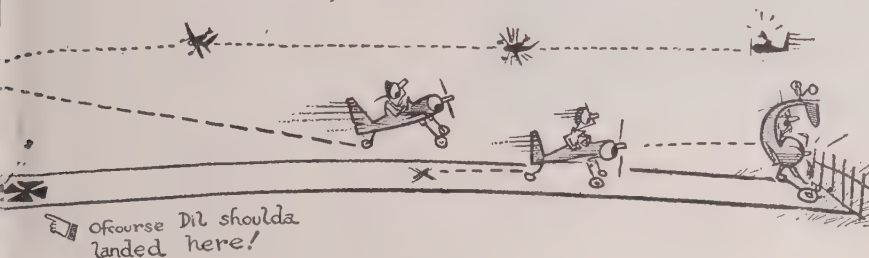
Dilbert reversed course immediately. One is tempted to say, "He got the hail out of there." He broke into the clear after about two minutes and slowed down. He looked over his plane and noticed the leading edges of the stabilizers were pockmarked with dents. He figured the wings must be similarly damaged, and realized this might effect their lift efficiency. So he grabbed himself some altitude.

At 6,000 feet he leveled off and tested the flight characteristics of his ship. He found everything OK except his stalling speed which had been increased by 12 mph. Allowing for this, he had no trouble in making a landing at a nearby field.

For my money, the pilot technique in this emergency was perfect. There was only one thing wrong—the emergency was entirely unnecessary. Dilbert didn't have an instrument card and should never have stuck his nose in the soup.

Learning to force yourself to reverse course in the face of adverse weather seems to be one of aviation's toughest lessons. Too often vanity is involved. There is only one way to whip this. Never procrastinate. Whenever you approach weather that looks dubious, play it safe. Stow your pride and turn back—and before you run into it.

A wounded vanity is better than a busted airplane.





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Leave It to Dilbert — Upon discovering that his hydraulic system had failed, Dilbert immediately returned to his home station. He reported his predicament to the tower, then followed emergency procedure for obtaining pressure, but all efforts failed. He did succeed in shaking his wheels down and getting them locked, but with the hydraulic system out, he had neither flaps nor brakes.

With the wheels locked down, the main danger had passed. Since he had a 7,000-foot runway on which to land, the lack of brakes and flaps should have presented no difficulty. But you know Dilbert!

He landed "hot" about midfield. Shortly after landing, he attempted to take off again, but the engine wouldn't catch. When he saw he was going to hit the fence at the end of the runway, Dilbert tried to groundloop, but this also failed.

Let's be Monday Morning Quarterbacks on this one, against the day when we may get caught in a similar predicament.

The initial error, and probably the most serious one, was the landing approach. Knowing he had no flaps or brakes to slow him down and shorten his landing run, Dilbert should have dragged into the field and touched down as short as possible. Even had he cut his switch immediately after his midfield landing, he still would have been safe. His decision to go around again should have been made during the landing approach. And finally, the attempted groundloop was a good idea, but the tail wheel should have been unlocked first.

X-C . . . Dusk to Dawn

(Continued from page 50)

We checked the ready-room, paused to thaw out beside the oil stove, and finally met the gas truck as it drove up from another parked plane. While our ship was being fueled, we had more coffee and pie at the airline restaurant in the terminal building.

Wichita has both a CAA weather bureau and a communications office. The weather man advised that we would buck 40-mph winds at 3,000 feet into Kansas City. If we went up to 5,000, the wind went up to 53-mph. The remainder of the weather was clear and cold.

We thanked the man behind the maps, walked next door and filed another flight plan to "KC," then trudged back out into the biting wind.

It was just after midnight, coast time, when we took off from Wichita. Rex was again up front while Coffey and the Doc dozed in the back seat.

The instrument altitude along the airways to Kansas City is only 3,000 feet. There isn't much sticking up above the oil wells and radio towers in Kansas. Into the stiff headwind, we took an hour and 32 minutes to reach "KC," only 176 miles distant.

Our group of night flying pilots were all beginning to get sleepy as we approached the Kansas City Municipal Airport over the famed stock yard area. On a straight-in approach to the north, a tall Armour Packing Company smoke stack sticks high into the air and is quite difficult to see in the maze of lights near the field. The airport is located on a sharp bend in the Missouri River, within a mile of the downtown area.

The "KC" tower answered our request for landing instructions with the admonition that "there is a 20-foot dyke along the south end of the runway. Land to the north. You are cleared on a straight-in approach."

The lights of the sleeping city drifted

by our right wing-tip as we let-down slowly into the busy field.

We landed at 1:50 coast time and didn't get off the ground again until 4:03. The reason—no gas! Soon as we landed we were met by a gas truck but—it carried 91 octane only. While it probably would have been okay to use that grade of fuel, the *Navion* normally runs on 80 octane. We waited while three "non-skeds" were fueled before having our tanks topped with 20 gallons of fuel. Of course, the delay gave us a chance at a Kansas City steak at the busy airport cafe, but we would have much preferred to have been on our way.

Out of Kansas City, there are five different airways. So many rotating beacons split the darkness that a visiting pilot could easily be confused. Our outbound course was over the Columbia range stations and eastward via St. Louis. There is a bend in the airway that goes north-eastward on a 52-degree heading to the Excelsior Springs fan marker, 27 miles out of town. Then the airway turns southeastward on a heading of 98 degrees into Columbia. Rather than fly this jog, we headed due east, 90 degrees, and caught up with the light line over the town of Marshall.

In cutting across airways where there are so many lights, the most important instrument on the panel is the magnetic compass. All radio range headings are magnetic so no variation need be added or subtracted. Only the small installation errors (deviation) and wind drift will make the compass heading differ from the radio range heading.

In following a compass heading alone, a newcomer to night flying should make sure that he is always flying with his wings level. This is even more pronounced in a side-by-side airplane, where a pilot has a natural tendency to fly wing low and make a gradual turn into that wing. The easy way to avoid this turning tendency is to pick out a cluster of lights dead ahead on the horizon when the compass has settled down and fly toward those

lights. Then compass checks can be frequent.

The gal behind the phone at the Columbia radio range gave us the latest weather as the first streaks of dawn showed beyond our spinning prop.

"This night flying is a cinch," said Doc. "The navigating is so much easier than in daylight. All you do is follow the light line and sooner or later, you're over your airport. I thought that it would be much more difficult. Now that the sun is coming up, it looks as though we will have to go back to work and navigate again."

"That's fine," we cautioned, "but remember, when the weather gets rough here at night, it gets rough in a hurry. Tonight has been as ideal a night to fly as you will find. If there is ever any question of weather ahead on your night country flight, stay overnight and take it in daylight when you can see where you're getting into."

"The thing that has surprised me along," commented Coffey, "was the amount of help you get from the ground via radio. The *Cubs* and other public jumpers I've flown have never had trouble. When I got away from my home field, I was strictly on my own."

And again there was another caution. "What happens if that radio goes out? It did with us later that same morning over Indianapolis) or there is so much lightning and static in the sky that you can't get any reception?"

The answer, of course, is to go into the airport and stay there until weather is good or your radio is fixed.

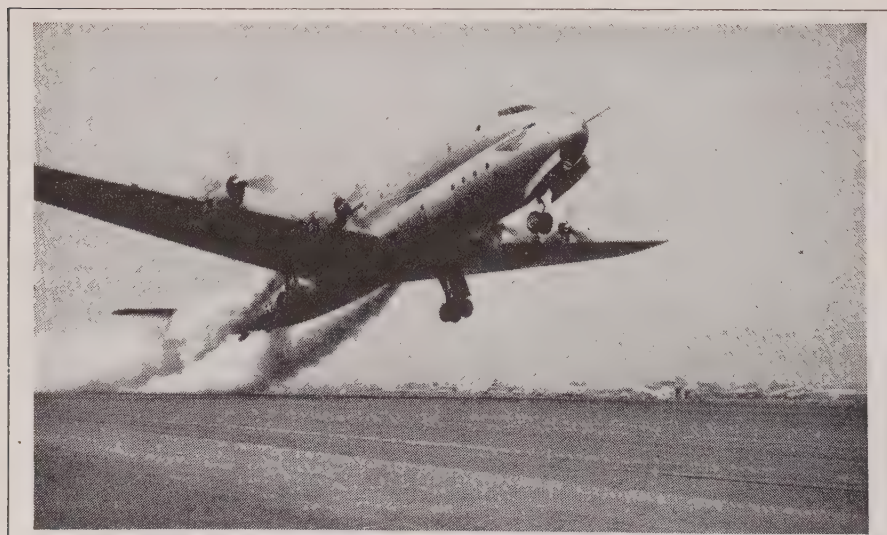
Rex's comment was, "this night flying makes a family four-placer just like your own little airline. You can go more or less as you wish, and you've got a whole lot of weather advisers, communications and lights all the way. No wonder airlines can keep such an efficient schedule. The courtesy and cooperation of transient pilots in little airplanes by staying on the ground certainly surprises me."

From this ideal weather experience, flight SKYWAYS has found that the average private pilot can fly cross-country at night without undue grief. We strongly recommend, however, the best of air maintenance for night-flown single-engine aircraft plus an extensive check-out by an instructor experienced in night flying. Inexperienced pilots who optimistically go out and try to fly cross-country at night without any instruction are sticking their necks out a long way.

This flight was made under the most ideal conditions to be found. In general, night flying is a wonderful experience, a pilot can get in trouble quicker and there longer when flying at night. Night flight, like a beautiful blond, should be approached with discretion.

The author of this article has logged 750 hours of night flying. He towed the first night experimental glider towed by the AAF Training School at Twenty Palms in 1942. He has logged first night cross-country time in C-47's both in the United States and over the Pacific. He flew over 300 hours at night as pilot and instructor in C-46's over the Hump.

Like most pilots, he received his first night flight experience by getting back home airport too late for daylight.



Jack-Rabbit Take-Off

Navy's Constitution, employing JATO in addition to its normal 14,000 horsepower, gets off runway like a fighter plane. JATO shortens ship's take-off run by 25 pct.

Piper Buys Stinson

THE personal plane industry received a boost in the right direction recently when it was announced that the Piper Aircraft Corporation had purchased the Stinson Division of Consolidated Vultee Aircraft Corporation. The wedding of Stinson to Piper brings together one of the most popular four-place airplanes and a line of low-cost two-place and four-place family planes that have maintained pilot and owner popularity for many years. The Piper name "Cub" is synonymous with personal aviation. The enthusiasm with which this Piper purchase has been received by aviation people reflects widespread belief that the Stinson, now manufactured and marketed under the stable and guiding influence of Mr. William T. Piper, is assured a brilliant future. Asked for a brief statement, Mr. Piper replied:

"**A**T Piper Aircraft we are very pleased in having been able to combine the Stinson organization and our own. The Stinson plane is recognized as one of the most useful, dependable and saleable planes ever to have been produced in this country. It has a safety record which can be equalled by few other personal planes. It has an excellent service record, and servicing accommodations for Stinson owners have been very satisfactory throughout the country. The Stinson planes have always represented, and will continue to represent, very high quality of workmanship and design.

"The Flying Station Wagon and the Voyager fit into our sales and production programs very nicely. Most members of our Sales organization, if they have not already been handling Stinson, have been lacking a plane in this particular price class. From now on we will be able to offer our customers a complete line of models ranging from about \$2,000 to \$6,500 in price. We expect to cover the entire personal plane market more thoroughly than it has ever been by one manufacturer in the past. Our representatives will be strengthened individually in handling an enlarged and improved line of models, and the whole group will be reinforced through the addition of about 300 experienced Stinson dealers to our standing force of over 1,000 Piper dealers.

"The details of our 1949 line of models cannot be disclosed at this time. However, we do expect to produce about eight different models, including four two-place planes and four four-place planes. These aircraft will follow the precedent of past Piper models in providing the most utility for the least cost. We intend to continue to produce models at as low a list price as possible and will take advantage of every opportunity to keep prices down and to reduce prices if practicable and, while holding prices to a minimum,



William T. Piper

we also intend to improve design and product quality wherever this may be accomplished. We have some features incorporated in our 1949 models that we feel will establish these planes as drastic moves ahead in the process of increasing the utility of personal planes.

"The year 1948 was somewhat disappointing for the personal plane industry, but I believe that in the spring of 1949 the aircraft sales trend will become reversed and that from that time on, barring a depression or some other unforeseen eventuality, our business will see a steady growth upwards toward a large future industry.

"Development in this industry will be slow and gradual as in any other large movement, while our people are educated toward flying, while planes are improved and airports built. More than anything else we need time, but our industry will eventually become big and well established against a background of utility, pleasure and general service to the public. This is the opinion which I held when Piper Aircraft was established many years ago, and it is the opinion that I continue to hold as the years go by."

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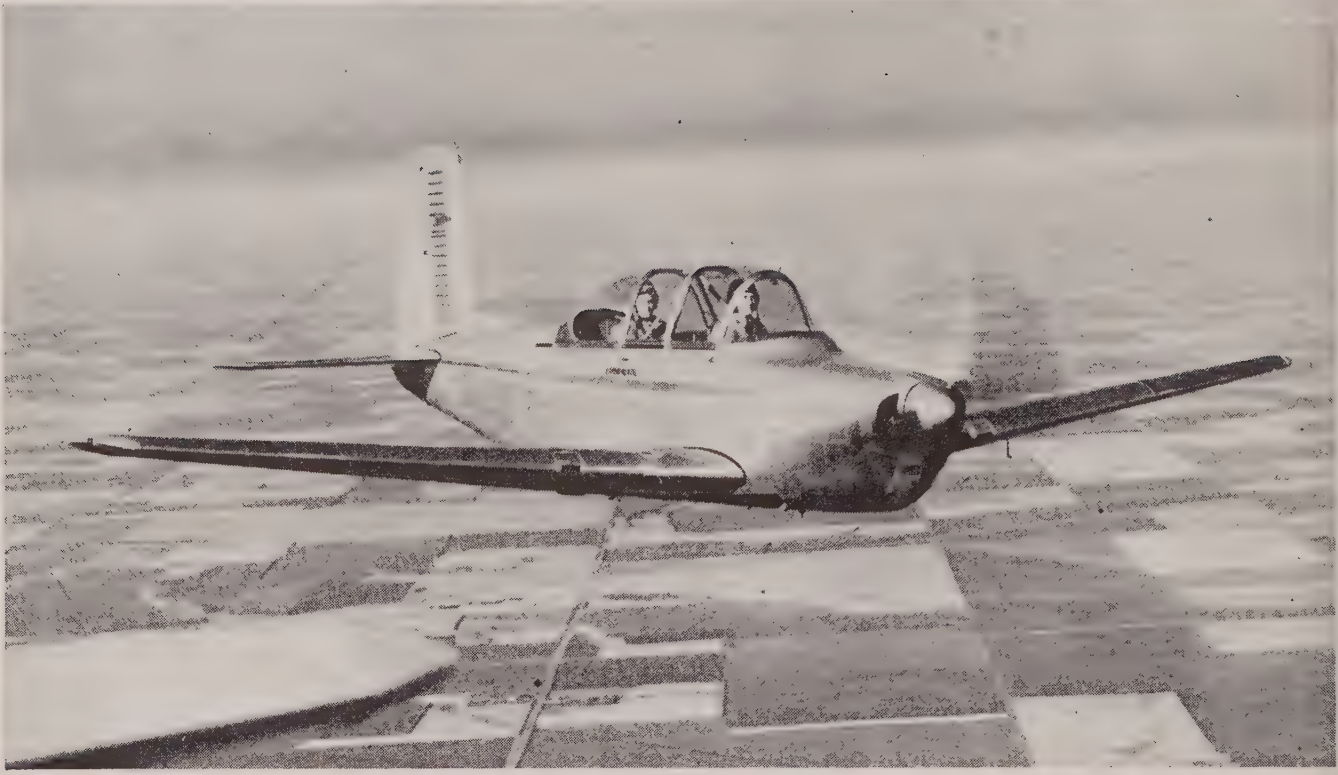
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BEECH MENTOR is a new single-engine, all-metal, two-place trainer in the primary and basic-advanced class. According to Walter H. Beech, president of Beech Aircraft Corporation, this ship was developed inexpensively, using the Beechcraft Bonanza as a basis.

Beech Brings Out New Model

CHIEF PILOT Vern Carstens accepts congratulations of Walter H. Beech, president of Beech Aircraft Corporation, after first flight of the company's new military trainer



THERE'S a new airplane in the Beechcraft hangar, this one specifically a military airplane, but privately designed and financed. Called the Model 45 *Mentor*, it is a primary and basic-advanced all-metal trainer that seats two, tandem-style. Powered by a Continental E-185 engine, the new ship has a cruising speed of 160 mph at 10,000 feet, a true maximum speed of 176 mph at sea level, and a permissible maximum dive speed of 280 mph. It has a 634-mile range at cruising, and a landing speed of 56 mph. with flaps.

The ship is now being readied for a special tour around the country for demonstration and inspection by U. S. military forces.

In explaining why he believes this new Beech airplane will be of value to today's air forces, Mr. Beech pointed out that the *Mentor* "has the tremendous advantage over other airplanes of its type by having extremely high performance combined with extreme operating economy and low fuel consumption." ✈

Airliner, Jr. Size

(Continued from page 45)

ision was the fact that it permitted a in entrance so near the ground that in a hobble-skirted executive of the called favored sex could climb aboard plane without undue exposure.

Next came the problem of engine place- ment—whether to have the engines pusher tractor installed. With tractor engines, group-decided, the weight and balance consideration would seat the passengers over the wing. This seating location would ult in noisy little propellers flailing and near the skin between the pilots and their passengers. Not good! So the radical decision in the design of the ship was made . . . the installation of pusher engines.

At first it was planned to install the engines so that the props would be just behind the trailing edge. Weight and balance consideration came into the picture again, however. The length of the nose of the ship with this arrangement would have to be much too long, abnormally long, in fact. The wing was designed around a conventional box beam, and the accessory side of the engine was placed as near the rear as possible, with the prop just behind the trailing edge. This meant a short drive shaft would be necessary. However, with the engine semi-buried in the wing and with only a small amount protruding beneath the wing, cowling would be an easy proposition.

Since the ship was being designed to house instruments, its having to sit, with engines running, at the end of a runway waiting for ARTC clearance would be inevitable. This meant there'd have to be an excellent ground cooling system. Therefore, a cooling fan was incorporated. Attached directly to the extension shaft, the engineers reasoned, it would cool the engine by drawing air through the baffling system. In the air, the fan would float the ram pressure into the front of the engine and would do the work.

On the landing gear category, the tri-cycle arrangement was the choice. The gear was designed and the installation made so that the nose wheel would retract into a box located between the pilots. The main gear, however, was set up so that it would retract into the rear of the fuselage instead of into the wings. The engineers preferred this arrangement because it eliminated breaking up the structure of the wings and, instead, left the wing structure uninterrupted from wing tip to wing tip.

Establishing proper balance, in the final analysis, provided the ship with a moderately long nose which promised to provide more than ample room for five people.

With such decisions made, work went forward on the actual construction of the prototype. Two years later, in October, 1938, the ship was finally flown. It has been flown many times since that date, and so far has lived up to the expectation of its designers and engineers. In fact, its high aspect ratio (eight to one) wing design has resulted in climb and load characteristics that are even better than were anticipated when the ship was on the drawing board.

Complete tests are now being flown

with the *Starflight*. From the study of the figures so far obtained, the pilots who've flown the ship list its cruising speed at 145 mph; its two-engine performance, 90 mph; and the range, eight hours.

The ship has a gross weight of 4,800 pounds, and an empty weight of 3,200 pounds. This is expected to be reduced to 3,050 pounds in the second model. Its wing span is 48 feet and its length, nose to tail, is 34 feet. Gasoline tanks each hold 43 gallons of gasoline, 172 gallons in all, thus giving the eight-hour range.

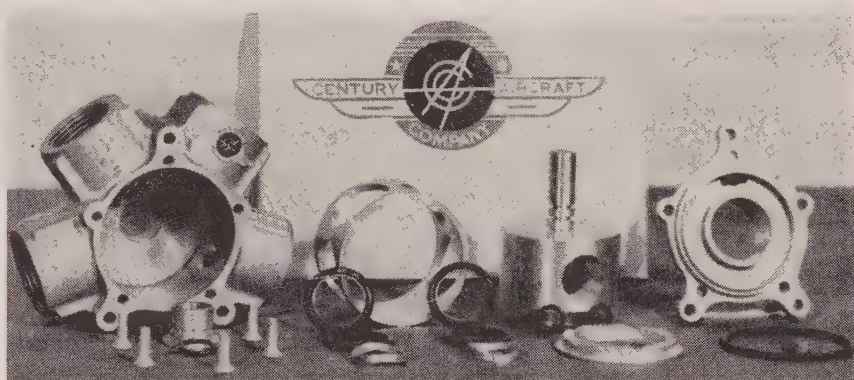
Asked by skeptics why he'd gone into the development of a four-engine private airplane, H. Farley Vincent, President of Monsted-Vincent Aeronautical Inc., put it this way:

"In aviation we are in the transportation business. Our transportation medium is the air ocean. Every rock in the desert, every tree in the forest, every spot on the sea is washed by this medium. There is no place on earth that cannot be reached by air. It is a safe assumption, therefore, that transportation which can navigate this medium cannot help but make spectacular progress. And this has been proved so.

Within the span of a few years, our airlines have gone from the single-engine open-cockpit biplane stage to the huge four-engined skyliners which serenely and safely cross the vast sea and land masses on the earth, and with complete acceptance from the traveling public.

"In the matter of short-haul transportation, it is difficult for an airplane to compete with an auto. But for business flying, the aircraft of the future must be long range . . . and this is the great undeveloped field, i.e. fast transportation over long distances. When long-range, safe, comfortable and economical flying is available on a private-plane basis for the business public, there will develop a field in aviation which will surpass anything ever done by the airlines or the military.

"There are some people in business who have not yet thought in terms of aircraft for business. But let their competitors begin to use their own planes, let them begin to corral the available business, and see what this fellow will do. He'll be there with a business plan! We think the *Starflight* will be the air travel ticket for that businessman."

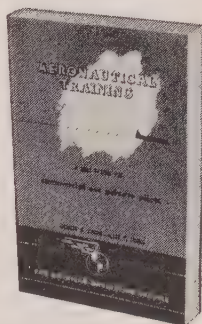


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Flying Stars

(Continued from page 53)

mings' instructor was a part-time airport operator whose regular profession was plumbing! Bob soloed at the plumber's small field in Joplin, Missouri, in a Mono Prep, with a 5-cylinder Velie engine.

"All I had was 3 hours and 20 minutes of instruction," Cummings recalled. "Then that guy told me to go out to the field, get the ignition key out from underneath an old oil barrel and take the plane up myself, as he was too busy. All I knew were landings and take-offs, and those only from the righthand seat. But somehow I managed to get the plane off the ground and back again, while a half dozen kids on the field kept yelling, 'Ooooh, look, he's flying.' Just to show you how little I really learned from the plumber, I still held full rudder on turns, even after 5 or 6 years of flying. I guess it was pure luck that I was never killed."

Actually, Cummings took up acting in order to help finance a flying school that he had bought into in 1934. His students were members of Hollywood's movie colony and his equipment consists of seven planes—Aeroncas, *Cubs* and Porterfields. Cummings himself turned flight instructor, but ran into a serious problem in 1937, when the Department of Commerce promulgated new regulations, under which no one without an official rating by the Department could give instruction. Faced with the prospect of losing his students, Cummings persuaded the local inspector to give him a stiff, day-long written test, as well as a check flight in Cummings' own Cessna (ironically enough, the inspector was not too familiar with the Cessna and Cummings had to acquaint him with the controls), but Washington finally okayed the written examination and three months later Cummings received his instructor's rating. With the certificate was a letter from the Department of Commerce's Robert R. Rining, informing Bob that his was the first official rating issued under the new regulations. Cummings just happened to be first in line.

When World War II broke out, Cummings sold his flying school and became an instructor for the Army, teaching primary and basic at Polaris Field during 1943 and 1944. Today he flies a \$35,000 Beechcraft which is owned by his company, United States Pictures—a plane that, according to him, is much too costly to fly except on company business.

Many of the Hollywood screen stars—some with incomes in the six-figure bracket—have what appear to be legitimate beefs against certain aspects of private flying. Character actor Walter Slezak has been flying only two years, but he has 180 hours of solo credit and has made a number of cross-country hops in his *Navion* between Hollywood and his farm in Pennsylvania. He believes that private flying can be bettered. Slezak waxed wroth over what he calls the mechanic's racket at airports across the country.

"You come in and land," he said, "and a mechanic walks up with a worried look on his face. You say, 'What's wrong?' and the mechanic says, 'I don't like the sound

of your engine.' The motor has been running perfectly but you listen. Maybe something is wrong. So you tell him to tune it up and you get a bill for \$45.

"At the next airport a mechanic walks up with a worried look and says, 'That landing gear—it looks haywire.' It has been working perfectly but you study it. Maybe something is wrong. So you tell him to look at it. Then you get a bill for \$18."

Brian Aherne gave frank expression to his thoughts on the subject of private flying: the lack of landing strips, the inconvenience attached to getting to the average airport, the fact that private planes lack real utility. But Aherne's major complaint was, of all things, based on something that isn't the manufacturer's fault. Aherne's trouble is his height. He's 6 feet 2½ inches and for him there isn't enough leg room.

"A tall man like myself is sunk," he said. "I just can't get into the average plane."

Aherne, of course, was merely getting a pet peeve off his chest, but he doesn't expect to stop flying. He's crossed the continent five times in his early Waco F3 and his Fairchild, which he owned later; has been flying since 1935 and was one of the original sponsors of the AOPA, holding membership No. 9.

With his new Beech *Bonanza*, Aherne thinks he now has the ideal plane for his purpose—for flying back and forth between his ranch in Indio, California, and Hollywood, cross-country trips, vacationing, pleasure jaunts and such. Despite his own feelings about the cost, Aherne is still and always will be a flying enthusiast.

One of the most pertinent thoughts on the subject of private flying was voiced by veteran pilot Andy Devine.

"Flying has to be made more convenient," said Andy. "Getting to and from the airport is just too much trouble at present. One of these days big companies who operate private planes for their executives and salesmen will move their plants outside the big cities where they can have their own field adjacent to their offices. That's bound to save hours of time for the men who use planes on business."

In operating his own flying school Devine has discovered that many young men who had been in the Air Force have no consideration for equipment.

"They were used to having the Government pay for everything, so they got into bad habits, rarely taking the proper care of planes. Then a lot of men bought surplus aircraft expecting to get a bargain. They didn't reckon the cost of maintenance and upkeep. Why, you take that AT-6—gas goes through that just like flushing a toilet!"

Obviously, Andy believes that the beginning flyer should own a light, inexpensive plane if he is to retain his enthusiasm for the sport of flying.

All in all, the Hollywood stars are not only serious and capable pilots, but they're pretty vocal on the subject of their hobby. Yet not one of those interviewed expressed any intention to stop flying, despite outspoken complaints and honest criticism. Like thousands of other pilots, they're in it to stay. You'll be seeing a great many more Hollywood luminaries in the sky from now on—and they are and always will be a credit to aviation.

Sonic-Speed Midget

(Continued from page 31)

it is shattered against a wall. During brief flight period, however, the results measured, telemetered, and recorded.

In one flight test experiment, a semispan model of the Bell XS-1 mounted in wing of a P-51D (now F-5 fighter plane for transonic flight tests. Instruments and recording apparatus placed in a neighboring wing cell, accessible by lifting a hinged section of the wing surface. With this setup, it possible to test the model at airspeed velocities—which were below, exactly at, or above the speed of sound—while full-scale airplane on which the model mounted was flying at somewhat below the speed of sound.

The phenomenon may be explained briefly by investigating the air flowing over the upper surface of the P-51 wing as pilot prepares to test the model at a particular speed. For example, suppose the model is to be tested before, and the speed of sound. As the airspeed of P-51 approaches a certain value, the over the test section of the wing (where the model is mounted) is accelerated approaches the speed of sound. This due to the fact that air has a greater resistance to flow in traveling over the wing than it does in traveling the same horizontal distance in the free stream. As a result, its speed is boosted. At some point of the wing, it may reach or exceed the local speed of sound. When the test speeds have been reached, the recording instruments are set to work by the pilot who controls at his fingertips.

Typical jet-engine testing includes simulating and accelerating at various altitudes and flight speeds, measurement of thrust, fuel rate, air flow, etc., in level flight at various altitudes in climbs and descents. Turbo-jet engines also have been tested in flight by mounting them in the fuselage of a medium or heavy bomber. Under these conditions, several technicians are carried along to read instruments and help in conducting the tests. One particular example of this set-up involved mounting a B-26 so that the tail end of the extended through the rear gunner's station. Ducts added to the lower half of the fuselage at the waist gun hatches supplied the engine with in-take air. A firewall was placed at the waist turret position with a window in it through which engine

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could observe the engine while in operation.

Turning back a few of the pages of history, we find that the British performed experiments during the war on falling objects such as cargo containers, buoys, mines and projectiles. In these experiments with drop missiles, for example, the body of the missile was made of cast iron and weighted with lead. Instruments to record reactions, etc., were mounted inside it.

The tests were performed to determine the rate of descent and flight paths of the objects. Rockets and parachutes were used to slow the descent near the end of the flight. Originally, flight path and speeds were traced by direct photographic methods. Today, however, radar, sound ranging and telemetering are employed to perform this task. In the photographic method, an instrument known as a phototheodolite was set up on the ground below the point of release. The trajectory of the missile was followed through binoculars and the information was supplied to the cameraman who adjusted the apparatus accordingly. Supersonic results were obtained since the missiles, falling freely, often reached terminal velocities in excess of 1,000 mph. The maximum velocity of any falling body depends, of course, on its shape and other aerodynamic characteristics. Thus, if specific information is desired on a particular wing shape or airfoil, it may be attached to a drop missile of proper design and tested at airspeeds within the required range.

As previously stated, rockets are being used to check and test models in flight. The object to be tested is mounted in the warhead of a rocket or at some point on the body of the rocket in a manner similar to the wing-flow mounting described for the P-51. Instruments and telemetering devices measure and radio the results to the ground as the rocket climbs to a predetermined altitude.

Recently such tests were run on a ramjet engine which was located in the warhead of a captured German V-2 rocket. Readings at considerably higher speeds than are obtainable in existing supersonic wind tunnels were recorded. Twenty-three pressure measuring points were installed in the ram-jet. Measurements, taken up to 100,000 feet were recorded by high-speed photographic devices in the receiving apparatus on the ground. This altitude is the highest practical flight altitude for a ramjet engine which depends on "ram" intake air for operation. As an illustration of the changing atmospheric conditions experienced by the rocket and ram-jet during the first 45 seconds of ascent—air temperatures varied from 70° or 80° F to minus 77° F; pressure dropped from 14.7 lbs per square inch to .155 lbs; density was reduced to about 1 per cent of the value at sea level. The speed of sound varied from 776 mph to 662 mph.

Throughout aviation history, scale models have always played the role of guinea pig in the transition from the design stage of the prototype construction and flight stage. Until recently, flight conditions were only simulated by blowing air over the model while it remained rigidly fixed in a wind tunnel. Today, however, the model is taken to the sky to blaze a path in advance of its big brother to follow. ✈✈

Go Round Again

(Continued from page 23)

under the GI bill with a major in journalism. He seemed an amiable, unimaginative sort." Ralph snorted, and went on. "Well, he does all right in his ground school, in his air work, and in his basic Link Trainer work. And he does all right in his radio range in the Link.

"He gets into the final week and goes in to get his GCA's in the Link Trainer. Now there's nothing really complicated about a Ground Controlled Approach. It's done with radar, and all the pilot has to do is get in touch with the GCA unit and they steer him in. They give him everything he needs to know until his wheels touch the ground. Just a matter of radio procedure and basic instruments.

"He gets O'Brien for an instructor." Ralph continued, "O'Brien's the best, a little dramatic, but he knows his stuff.

"It takes about 20 minutes to run a GCA and O'Brien generally gives 'em three at a time. Then he takes them out and shows them what they did wrong. These Links have everything, even a gas gauge. To keep the pilots from horsing around, O'Brien winds the clock up to indicate one hour's gas supply. If they're not through by then, the power cuts off and the trainer sort of falls over to one side.

"Well—O'Brien puts Bob in the Link, winds up the gas gauge, takes off the straps and puts the hood down. What happens after that, I can only speculate.

"Bob shoves in the throttle and starts climbing up to his assigned altitude. At 5,000 feet, he levels off and calls GCA for landing instructions. All he has in front of him are luminescent instruments and he can hear the turbine under the trainer. After you listen to it for a while, you can almost imagine it's an airplane engine. Bob checks his manifold pressure and directional gyro, and sets his artificial horizon.

"A voice identifies itself over his headset as the GCA initial approach controller, and gives him a steer. He flies this heading a while and gets another steer. The voice tells him he's on this down-wind leg and to let down to 1500 feet. He lets down straight ahead at an indicated 500 on his vertical speed. They turn him on to his base leg and give him a cockpit check. He acknowledges his gear down and locked and they turn him on final. Another voice cuts in and tells him to let down at 500 feet a minute. This voice has a sense of urgency and talks to him constantly. It says he's above or below the glide path, steer right two degrees, then left one degree. The voice tells him he's coming over the end of the runway and doing fine. Bob smiles and starts his flare-out. He can almost hear the tires squeal as they bite into the runway.

"But then the voice tells him to take off and go around for another try. Bob adds throttle and keeps the needle centered, and the altimeter rises steadily. On his second one, he is just as good; he splits the runway right in the middle. But by now he's perspiring a little.

"As he pulls up to go around for his third one, the voice gives him a new heading and tells him the wind had changed—he'll have to use a different run-

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way—and there'll be a cross-wind from his right on final. Bob checks his instruments over very carefully, no doubt. On his base leg, the voice cuts in for final cockpit check. Visibility is down to one-quarter mile, the voice says. Bob checks his gear switch light and acknowledges. He's feeling a little tenser now . . . maybe because it's a strange runway, visibility is bad and there's a cross-wind. He leans forward in his seat a little. He's breathing a little faster and his stomach sorta follows his heart toward his throat.

Then Ralph shrugs his shoulders and says "Well, that's about all there is to it."

"What happened?" I asked.

Ralph smiled, "The rest of the story I got from Instructor O'Brien. It seems he turned Bob on final and, being the final approach controller, proceeds to talk him down. When Bob's about a mile from the field, O'Brien stops talking. When a pilot on GCA final approach doesn't get instructions within five second intervals, he is supposed to use emergency procedure—which means to pull up and get the hell out of there. O'Brien told me that Bob pulled the nose up all right, and the power went off at the same time. The fuel gauge clock had evidently run down. O'Brien called him and told him to raise the hood, but Bob didn't answer. O'Brien figured the radio must've gone on the blink when the trainer cut off, so he went over and raised the hood."

Ralph stopped, a grin crinkled the corners of his eyes. "Yeah, you guessed it . . . unconscious . . . fainted dead away!" ✈✈



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Quit Stalling Around

(Continued from page 49)

be no cure-all for stall-spin accidents because nothing can force the pilot to drop the nose of the airplane when an approaching stall is indicated. But, with the indicators now on the market, if back pressure on the stick is released when the panel-mounted indicator light shows or the warning horn blows, the plane will not stall in any non-acrobatic maneuver. And since stalling means primarily that a certain angle of attack has been exceeded these indicators, which are essentially angle of attack indicators, maintain the same range of accuracy of operation regardless of the other variables such as altitude, attitude, load or throttle setting.

The Safe Flight stall warning indicator, one of the types currently available, was commercially installed for the first time about two years ago. At the present time these indicators have been installed in more than 4,000 airplanes of types ranging from low-powered trainers to high-speed jet fighters and airliners. So far there has been no record of any indicator-equipped airplane being involved in a stall or spin accident, according to Dr. Leonard M. Greene, inventor of the device.

Each year, according to CAA reports, one plane in approximately every 170 private and commercial planes gets into a fatal stall-spin accident. So, if, by the time the 4,000 planes complete a year's service, the good safety record is continued, the indicators will have prevented about 23 fatal accidents.

To get back to flying by feel, vision is normally the most important of the senses used in contact flying but for two reasons is of minor importance in detecting approaching stalls. One is that the altitude of the airplane has nothing to do with stalling and the other is that the airspeed reading, even if you had time to keep your eye on it constantly, gives no uniformly reliable indication of how close to the stall you may be flying. This is because stalling is almost entirely dependent on the angle of attack to the wing. For any given configuration of the airplane, that is, flaps retracted and landing gear fixed, for example, it will always stall at the same

angle of attack of the wing. This is true regardless of load, g's, altitude, attitude, airspeed, temperature and practically regardless of power.

For any combination of these variables the airspeed may vary widely, as may the attitude of the airplane, the feel of the controls and the position of the controls. Thus hearing and feeling are not infallible aids for sensing approaching stalls in a wide variety of maneuvers. Particularly is the "seat of your pants" unreliable when you are trying to recover from that spin you just fell into while trying to do a vertical bank at 500 feet and wave to Myrtle in her back yard at the same time. If you're so close to the ground and it scares you into pulling up too abruptly, you go into that secondary, high-speed stall without room for another recovery. That, at least, could have been avoided.

Then there is the case of checking out in a new plane. You should remember that the fine points of sensing what an airplane is doing even in straight-and-level flying are not directly transferrable from one plane to another. It may be possible for you to check out in a new airplane to the instructor's satisfaction by flying around the pattern a couple of times and making passable take-offs and landings. But that doesn't mean you could detect a stall in the making during the gliding turn into a final landing approach soon enough to apply the corrections in time to avert an accident. Obviously, the thing to do after a short check-out in a new ship is to spend the next available hour or two going through the various maneuvers to learn how it feels and responds to the controls in all flight conditions that might be encountered by the average pilot, including stalls and spins.

Feel is important in contact flying, in fact, it is indispensable. But know its limitations and act accordingly. Then you won't find yourself in trouble.

Wouldn't it be nice if you had an "instructor" always riding with you on the instrument panel? An instructor that is always right. If, just once, you saved yourself a 300-foot stall recovery, when you had only 295 feet to do it in, because you were told the right moment to relax that back pressure on the stick wouldn't you feel that the \$60 or so that the installation of a stall warning device costs you was worth it?

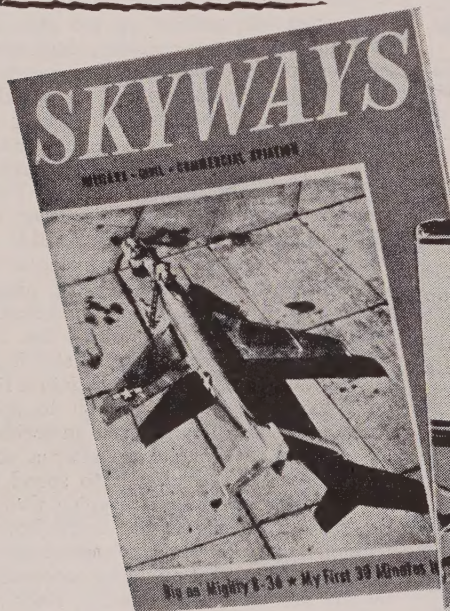
In the face of the unfavorable accident statistics that private flying has compared to other types of transportation and sport it seems extremely desirable, if not absolutely necessary, to adopt whatever airworthy instruments and safe practices are needed to decrease accidents resulting from unintentional stalls. You may think that another light on the instrument panel is something to be avoided. But why should there be any more aversion to a light for indicating an approaching stall than to a light indicating the landing gear is still up?

If you want to fly by the "seat of your pants" that's fine; if you can do it successfully all the time the stall warning light will never shine in your face nor will the horn blast in your ear. But in case, just in case, you make a mistake it very probably will prevent you from becoming just another accident statistic.

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